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FOOD MANUFACTURE

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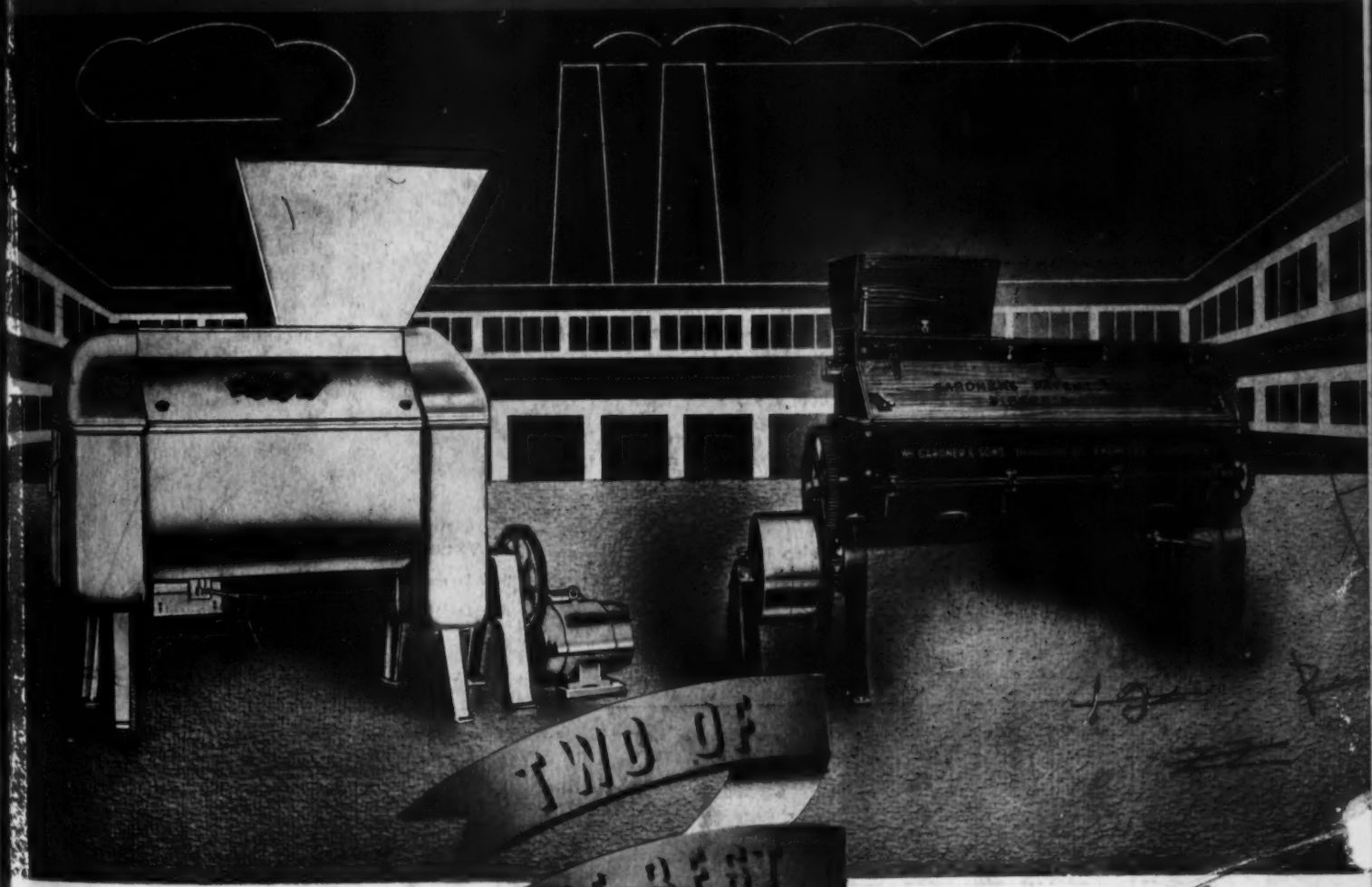

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FOOD MANUFACTURE

Incorporating Canning, Packing and Preserving.

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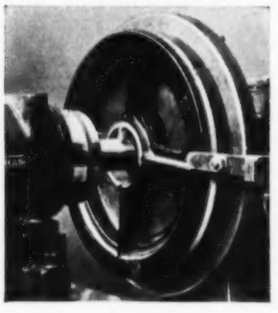

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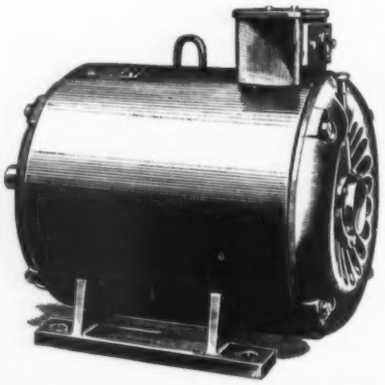

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FOOD MANUFACTURE

Vol. XIII, No. 9 September, 1938

Candy for Championships

ACCORDING TO the *Confectionery Journal* Dr. Mal Stevens, the head football coach of New York University, declared to the National Confectioners' Association, New York, that the consumption of sugar or confectionery was essential in building good athletes. Athletic trainers vary in their ideas as to what produces the best from their teams. Oxford has long relied on beer and beef in preparing for the boat race, but the results of the last few years do not indicate the total infallibility of this. In America—where the sweet-tooth has always been in evidence—the coaches now pep up their players by feeding them with confectionery and glucose—dextrose in some assimilable and palatable form. Dr. Stevens said: "It must be kept in mind that during heavy exercise, the sugar reserves of the body become depleted and, therefore, the glycogen demands of the muscles are great. . . . When sugar is digested it is transformed into dextrose, and dextrose is to the body what gasoline is to the automobile. It acts like a 'shot in the arm' to those who are fatigued, for it is absorbed promptly—quicker than any other food. For this reason I believe it is the best food for the immediate relief of fatigue. This year I plan supplying candy as a regular dietary item". A very good idea if it is remembered that sugar only produces energy, and energy without a sound body is as useless as a can of petrol without an engine.

Prussic Acid Vapour

The use of hydrogen cyanide for fumigating ships, factories and food warehouses is becoming very popular. It is also to be met with in certain industries such as blast furnaces, dye works, gas works and gold mines. There have been recorded a number of fatalities on account of the presence of small quantities of the gas, but, in view of its widespread use, these are remarkably few. It is a very toxic gas and slight symptoms may arise from as low a concentration as 1 in 50,000 and 1 in 500 can be fatal. It must also be remembered that a respirator is not a complete safeguard as the gas may be readily absorbed through the skin, especially if this is wet. Anyone given to heavy perspiration may easily absorb a dangerous dose in this way. Any methods, therefore, for the detection of traces of the gas are very imporant, and the Department of Scientific and Industrial Research is to be congratulated on the excellent pamphlet which describes the standard method of detecting the presence of the gas. A sample of the suspected air is drawn by means of a hand pump through a piece of test paper impregnated with Congo Red and silver nitrate or benzidine copper acetate. The colours produced are compared with standards illustrated in the pamphet. The tests detect as little as 1 in 100,000 and give a rapid indication of the safety or otherwise of the air.

The Wheat Surplus

Not very long ago people were moaning about bad harvests, wheat shortage and world famine. Now experts are becoming apprehensive about a possible heavy surplus and already there is a talk about quotas and subsidies. According to one authority the total 1938 crop of both the Northern and Southern Hemispheres may show an increase of about 250,000,000 bushels over the second crops of 1928. Stocks of old wheat in the world at present are estimated to be about 725,000,000 bushels, an increase of about 150,000,000 bushels over those of a year ago. A year hence it is suggested that stocks may exceed 1,150,000,000 bushels or an increase of 425,000,000. Obviously this situation is causing some concern among the wheat-producing countries, and some Governments are proposing a subsidy on exports. Others are advocating export quotas. Those who prefer the latter, urge that subsidies would lead to competition on a new basis, and the size of the subsidy would become the determining factor in effective competition between exporting countries. It must be remembered, however, that before a quota system can become operative, agreement between all exporting countries is essential, and, a few years ago, Argentina clearly demonstrated the futility of such agreements. The Canadian Government has decided to fix the price of wheat at 80 cents a bushel, and this decision has provoked sharp criticism on the ground that it is tantamount to a subsidy and constitutes a reversal of the Government's declared intention

to give free play to the laws of supply and demand. We have always held the view that any attempts to interfere with nature and the laws of supply and demand are doomed to failure, and we shall watch with interest the events of the next six months in regard to wheat.

Sir A. Salter Disapproves

Sir Arthur Salter, M.P., is by no means beguiled or misled by the Government's spending 7½ millions sterling on wheat, sugar and whale oil. Many people who had given the matter but little thought were lulled into complacency, imagining that the Government had the food problem well in hand. Sir Arthur Salter, in company with others who have studied the problem, is not hoodwinked. "Expenditure upon the initial stock of food reserves, being non-recurrent and used for what is of real and realistic value, is perhaps of a more genuinely capital character than anything else in our defence programme, which we were financing to an extent of £400,000,000 in five years upon a loan basis. In assessing the cost of providing food reserves, in relation to other defensive measures, we should therefore take the annual interest on the cost of the initial purchases and add the costs of turnover and maintenance. On this basis the annual cost of what has been done is only between £250,000 and £500,000, and the higher of these figures is only half of what we are expending *per diem* on imports alone of food, feeding stuffs and fertilisers. . . . Is between 1 per cent. and 2 per cent. of our annual defence expenditure excessive for so vital a purpose?" Sir A. Salter is not alone. T. H. Fairbrother, who first raised the question of food reserves in his article in FOOD MANUFACTURE, entitled "Are We Prepared?" commenting on the Government's action, in our contemporary, *Food Industries Weekly*, said: "I feel that while the Government, like Barkis, have shown willingness, they have completely failed to face the real problem, which is the provision and storage of food and not merely forward buying". We ourselves feel that only the fringe of the matter has yet been probed, and we hope that Sir Thomas Inskip and his men are investigating actively this very vexed question.

More Jams

We understand that the hearing of the raspberry jam case to which we referred last month in our paragraph "When Experts Differ" has been postponed until the autumn on account of the indisposition of the magistrate. Perhaps when he recovers and the case comes up again someone will have discovered another method of interpreting total solids, which might make the jam appear to be most superior raspberry jam. It will still be the same old jam, however! Another jam case heard recently was one where the manufacturers were summoned for manufacturing jam containing 140 parts per million of sulphur dioxide. The sanitary inspector bought a 1-lb. jar of apricot jam and sent a portion to the Public Analyst in the area, who found 140 parts per million against the statutory allowance of 40 parts. The manufacturers had a sample of the jam from the same stock at the same shop analysed by Mr. Macara of the British Association of Research for the Confectionery and Jam Trades. He only found 22·6 parts per million. Mr. Macara then analysed the duplicate sample taken by the sanitary inspector and found only 40·6 parts against the 140 alleged by the Public Analyst. Now the sample has been submitted to the Government chemist for an independent report. It is high time that before traders are forced to the indignity of a prosecution, the prosecution should, at any rate, know what it is talking about. The analysis should be duplicated and even triplicated before action is taken. If the analyst has made a mistake the public will never hear about it or, if they do, will soon forget it, but the jam manufacturers will have to put up with the stigma of "You know that muck there was a prosecution about having so much sulphur dioxide" for a long time. The public seldom forgets prosecutions.

Agricultural Research

Although we cannot ever be regarded as a great agricultural country, no one will deny the importance of farming such land as is possible in a crowded community. This very importance demands that farming should be on the intensive system, and where anything is produced on the intensive plan much research is needed. It is interesting to the layman, who is interested in agriculture and food supplies, to be able to obtain some authentic information about what is going on in this way of research in agriculture. The report of the Agricultural Research Council for the period October, 1935, to September, 1937, which has been published recently, gives some interesting data. It has been agreed to curtail the breeding programme at Long Ashton Station and concentrate mainly on the production of varieties with specific properties, such as vigour and disease resistance. The breeding of cider apple varieties will be continued, as

there is much scope for improvement in this class. This decision to reduce very considerably the number of fruit varieties offered for commercial distribution is in keeping with a similar movement in regard to other crops in European countries, particularly Holland and Germany. The report indicates the great interest being taken by growers and the cider industry in new work on fruit juices other than cider. These include new fruit juices, fruit syrups, alcoholic drinks and squashes. It is hoped that the milk bars will utilise some of these syrups instead of the synthetic stuff now used. Much of the work in these fruit juices is due to Mr. V. S. Charley, and he has exercised technical control over a manufacturing process for a Bristol firm. These are a few of the points in the report which we feel would interest many people by indicating to them new developments and lines of research.

Smaller Pan Sizes

The American bakers, as represented by the Wisconsin Bakers' Association, want a law limiting the sizes of bread pans to 9 inches. They guess that folks buy bread by the loaf, but eat it by the slice, and when that slice happens to be bigger—why, folks won't notice they are eating more!

To get 90 slices of bread you want 3·46 13-inch loaves, while in the case of a 9-inch loaf you have to buy 5 of them for your 90 slices.

Hence at 8 cents a loaf you pay 40 cents for your big-sliced loaf and 27·68 cents for your small-sliced one. In support of the big-slice theory, evidence of the *per capita* consumption in different years is offered. In 1929 it was 81 lbs., and in 1933, "the peak of the large-pan mania", the consumption had dropped to 64 lbs.

The repercussion of this 21 per cent. increase is shown by figures giving the extra amounts of agricultural products going into the bread, and it is suggested that if a law were passed limiting the sizes of bread pans to 9 inches, it would benefit quite a number of people. The idea is ingenious and might be worth the study of the "Eat More . . ." specialists in other food departments. Doubtless, with the help of the psychologists, they will avoid the point at which the slightly deluded consumer would realise that he is being stuffed.

The "Wonder Bean"

A little book on the Soya Bean, written by Elizabeth Bowdidge, was published in 1935 which purported to "help to show how the bean, now successfully acclimatised to the soil and weather conditions of England, can be grown profitably and eventually on a commercial scale". Experiments made at Boreham, Essex, in 1933 and 1934, are described, and acclimatised varieties comprised a green bean "Jap", a brown bean "C", a black bean "O" and a yellow bean "J". The highest yields were afforded by the "C" variety and amounted to 13 cwts.

Sir Rowland Biffen, consulting botanist to the R.A.S.E., has recently reported unfavourably on cultivation experiments which have been carried out on the bean during the past 20 years in this country.

The highest yield (from No. 1 of Manitoba Brown) out of some 200 varieties did not amount to more than 10 cwts., whereas, in Sir Rowland's opinion, a variety affording a 30-cwt. crop, which must mature earlier than any of the varieties hitherto experimented with, would have to be found before British farming could be benefited. The results of his experiments up to date have demonstrated that only about half the varieties tested produced seed, and that only six gave sufficient yields to warrant small-scale field trials with a view to collate further data.

Not a very encouraging outlook for a new crop. Still, in view of the remarkable success attending experiments on wheat varieties, there remains a hope that a bean having the requisite characteristics may be evolved some day. It is interesting to note that soya beans are being produced in Canada on a small but increasing scale, and that fundamental work is being undertaken in their composition to determine the distribution of oil, proteins, phosphatides, etc., in the commercial products prepared from this material.

Those interested in Soya Bean Products will welcome a recently published monograph by Dr. Horvath, *The Soybean Industry*, which deals with the subject from a technical angle. Dr. Horvath went to China and Manchuria to study the soya bean at first-hand and for eight years followed and studied the product in Harbin, Dairen, Tientsin and Peking. In 1927 his booklet *The Soya for Food and Feed* was published by the Manchurian Research Society. In 1930 the Chinese Government printed his study of *The Soybean Oil of China and Its Manifold Uses.*

This new book will be invaluable to technical workers as well as to dealers and executives in the soybean industry.

Baked Beans—Jersaise

Few people, probably, know that the nowadays famous baked beans are a traditional dish which is

believed to have originated in the Island of Jersey. Even that famous member of the 57 varieties can claim direct descent from the Channel Islands.

It appears that the early colonists of New Jersey —many of them Jerseymen by birth—took not only the name of their island with them, but also their ancient dish of oven-baked beans to their new land. In those days, of course, the preparation of the dish was very different from that of the product now so widely known and enjoyed as baked beans in tomato sauce. Essentially the dish was composed of both broad and haricot beans, pork hock and sundry other ingredients. These were placed in an earthenware crock—that the receptacle, be it noted, should be of earthenware, was most important—covered with water and baked in the oven.

The fame of the dish spread throughout the United States to its eventual adoption as one of the most popular of canned foods. In its metal jacket, it having retraced its steps and reached the land of its birth again, it is in such a form that, to the younger generation in those Islands, the food is today best known.

Among the older folk, the traditional method of preparing the dish is still in vogue, and no one privileged to taste the beans cooked thus can fail to remember forever afterwards the grand aroma and fulsome flavour of them when served scorching hot. However, ovens being far less fashionable than once they were, accommodation is sought of the baker's oven, and on a Saturday night one can still see a crock or two being carried to the bakehouse for retrievement after an all-night session in the oven for the chief Sunday meal.

A Jersey firm has for some time past been engaged in the canning of the beans baked in the "good old-fashioned way". Assuming the product of the local firm to be comparable with, even if it does not excel in quality, the better known and established brands of a similar product, it will be interesting as a point in the study of the psychology of the purchaser to see whether popular taste can be weaned back to the original type of product. Among the members of the older generation on the Island, the continued success of the venture seems assured. Whether the younger folk can relinquish their thought habits of associating baked beans only with tomato sauce, and the seemingly decorative morsel of pork so usually found with them, is another matter.

Bakery Research

From time to time during the last few years the need for a National Research Association for the baking industry has been discussed, and a recent attempt to launch an association was made, the necessary finance for which being the rock upon which it split. Our contemporary, *Food Industries Weekly*, as long ago as 1936, commented upon a similar scheme.

Another scheme is under consideration by the N.F.B.S.S., the executive committee of which is determined upon its success. It owes its origin to Mr. W. Rees Jones and is based on a contribution by the bakers of one penny per sack of flour. Our contemporary points out that the amount, while being so small for each individual, taken as to be almost negligible, would produce sufficient funds to establish and maintain adequate laboratories and their staffs.

The need for standards was discussed at the recent conference of the National Association of Master Bakers, and Mr. S. W. Butterworth appealed for the formation of a Standards Bureau in the Trade. In our present issue we publish an abstract from an article by Mr. J. Valentine Backes, which treats of the same subject. In this epoch of science and industry, it is only a matter of time before the bakers have facilities similar to those enjoyed by other sections of the food industry, and whether this may be achieved by launching out into a completely separate association, or whether, as one of our correspondents suggests, by collaboration with some existing body, is a matter of detail.

Oracular Cookery, 500 B.C.

When Crœsus, King of Lydia, was considering war with the Persians, he sent servants with queries and gifts to the oracle at Delphi. The Pythoness, Aristonice by name, answered him in hexameter verse:

"I can count the sounds, and I can measure the ocean;
I have ears for the silent, and know what the dumb man meaneth,
Lo! on my senses there striketh the smell of a shell-covered tortoise,
Boiling now on a fire, with the flesh of a lamb, in a cauldron,
Brass is the vessel below, and brass the cover above it."

Since this peculiar form of cookery happened to be just that with which Crœsus was occupying his leisure time, he was overjoyed at the accuracy of the reply, and he adjudged this to be a good enough omen to justify his war against the Persians, and went to it with a will. He was wrong! Which just goes to show that an undue and somewhat unhealthy interest in peculiar cookery may have far-reaching effect.

McDOUGALL BROTHERS' NEW FACTORY

In 1868 home-cooking started to be revolutionised and the results are to be seen in almost every household—the use of self-raising flour. McDougall Brothers originated and developed the new flour and its history is in large part the history of the firm. McDougall Brothers occupy a vast new factory on the Isle of Dogs where the process of self-raising flour production is carried out. Four hundred feet of quay—a spectacular ferro-concrete silo—special automatic packing—the new factory is one of the outstanding achievements of the food industry.

The following pages give an account of the new home of McDougall's Self-Raising Flour visited recently by our special representative.

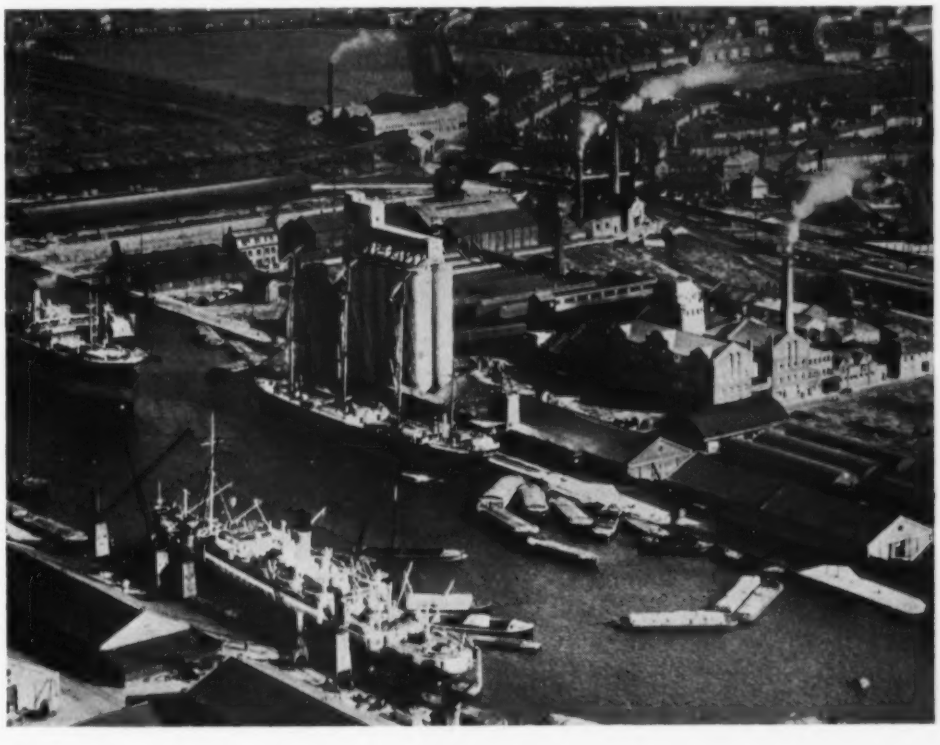
SEVENTY YEARS ago McDougall Bros. introduced self-raising flour. It was a new idea, and, like all new ideas, it met with suspicion, but this suspicion was gradually dissipated, and now carefully compiled statistics show that an overwhelming majority of housewives who practise home cooking are self-raising-flour-minded, and the manufacture of this flour has now become a very important section of food manufacture.

McDougalls have always been associated with self-raising flour. They originated it, and have developed it, keeping pace with fresh discoveries and modern machinery. Unlike many manufacturers of self-raising flour, McDougalls are the actual millers and not merely the packers of the flour.

It requires a special type of plain flour, quite distinct from the strong glutenous bread flour, and must be of medium strength, with the gluten stronger than that for biscuit flour, but not so strong as for a bread flour. The ideal way to make a reliable and consistent self-raising flour is to select wheats specially for the purpose, to condition them to exactly the right temper, and to mill them on a milling system which is suited to these wheats. The carrying out of these operations was demonstrated to us on a recent visit to the magnificent modern building recently erected at Millwall.

McDougalls' mills and self-raising flour factory are situated in the middle of the Isle of Dogs, and have an extensive quay of 400 feet at the Millwall Dock. Ample facility for transport by water, rail and road exists. Our visit was primarily concerned with the inspection of the

Aerial picture of the new factory and its surroundings. The huge silo is seen in the centre.



The movable suction intake unloading wheat from the hold of a ship.

new self-raising flour factory, but we were privileged to visit the up-to-date mill with its magnificent and spectacular ferro-concrete silo, capable of holding large stocks of wheat, and a thoroughly up-to-date cleaning and conditioning plant. To this, McDougalls have recently introduced automatic mixing and packing. The automatic packing of flour is a specialised problem, complicated by the variations introduced by granulation and consistency. With the co-operation of a well-known engineering firm, a machine was constructed which overcame the problems, and recently McDougalls have completed the installation of half a dozen of these robot packers, which start with a sheet of paper and end up with a sealed bag of flour.

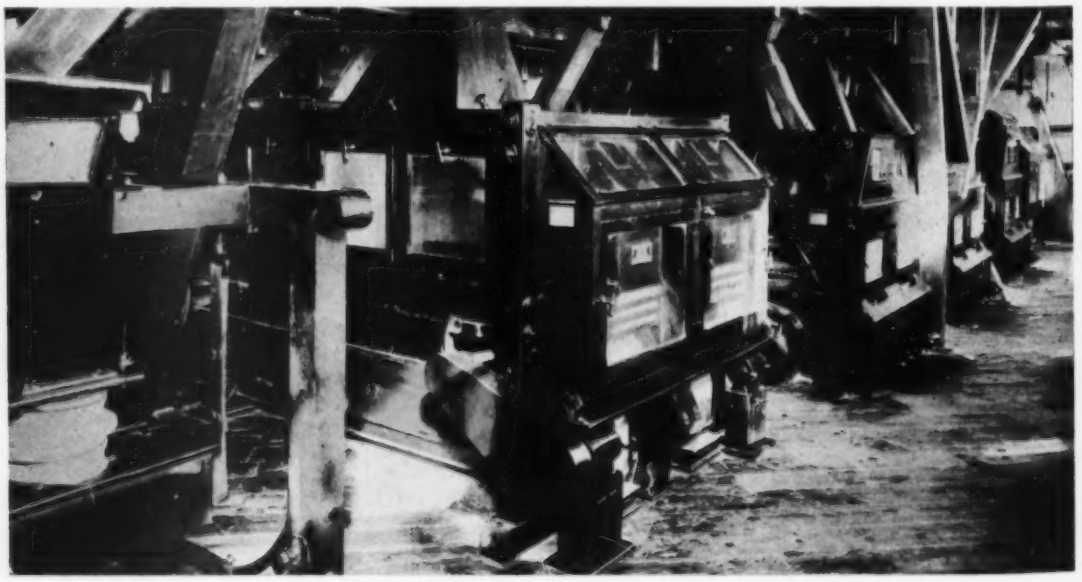
Wheat Intake

Before proceeding to the self-raising flour factory we inspected the new ferro-concrete silo, with its quay frontage which allows big ships to be unloaded with the minimum of manipulation. The suction intake is movable, and can be run from one end of the quay to the other according to which hold of the ship is being unloaded. The capacity of this intake is up to 180 tons per hour. The silos are essentially storage bins for dirty wheat. The wheat from the ship passes over an Avery weigher and then over a Bishop machine, where two separations are effected and coarse strings and fine dust are removed. The wheat is then elevated to the storage bins.

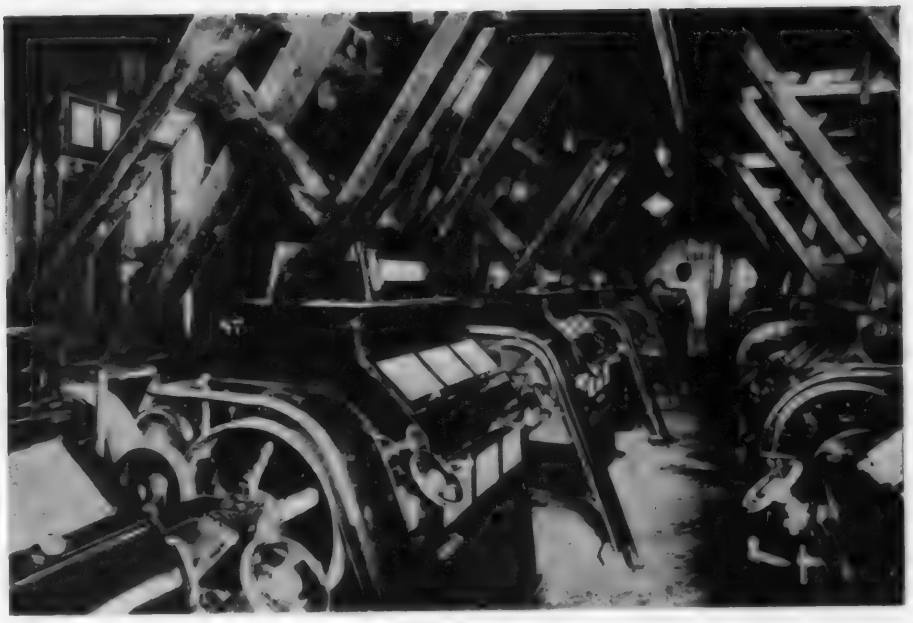
Dry Cleaning

From the storage bins the wheat passes through a plansifter grader, which divides the stream into two grades, large and small, and there are two separations of screenings, coarse and fine. The two streams pass through the cyclone pneumatic separators, in which the grain falls on to a revolving table and is whirled into a strong air current. The aspirations are blown into an expansion box, where the majority of the screenings are deposited, and the air afterwards is subjected to a cyclonic action for the separation of the lighter dust before being used again for aspiration. The wheat streams are led thence to the Carter Mayhew separators, where cockle and small seeds are removed from the small stream and oats and large cereals from the large stream. Peas and round seeds are removed on a special separator resembling a helter-skelter. As the mixed grain whirls down this, the round seeds form into one stream and the elliptical seeds into another. In this way a very good separation is effected.

Next, the wheat passes through a magnetic separator, where metallic impurities are removed, after which it is scoured in an emery scourer. This, after passage through



The purifying section.



The milling section, where the grain is subjected to breaks, scalping, grading, purifying, reduction and, finally, dressing.

another cyclone pneumatic separator, completes the dry cleaning process.

Washing and Conditioning

The dry cleaned wheat next passes through a washing and stoning plant, where much dust and small stones are removed. It is advisable to wash all wheat, even though this involves more drastic drying in the case of damp wheats. This stage of the process is most important, for the different wheats available to the English miller have their own individual optimum moisture contents for good milling. Thus, an Australian wheat should not be conditioned to over 15·5 per cent. moisture, whereas No. 1 Manitoba mills very well at about 18 to 19 per cent. moisture. At this stage, as a result of careful moisture tests, the requisite moisture is added to dry wheats by means of water wheels, or, in the case of damp wheats, the excess moisture is removed by adjustment of temperatures and fan slides. The machines known as "conditioners" may function as conditioners for forcing moisture into the berry or as dryers for removing excess moisture. McDougalls employ two systems of conditioning—(1) the Hall and George system, (2) the Simon radiator system. Both systems, if properly adjusted, give very good results. In the Hall and George machine the air passes over heaters outside the machine and is drawn through it by fans. If the objective is drying, the hot air is drawn through the wet wheat and discharged to atmosphere. If the objective is conditioning, the air is circulated round the heating section, with the result that the wheat is kept in contact with hot moisture-laden air and some of this is forced into the berry. In the Simon machine the wheat flows round hot surfaces of radiators heated by hot water from calorifiers. The wheat is in the conditioner about 40 minutes, and to allow the physical and biochemical changes to be completed the wheat should lie for about 48 hours before milling. The wheat cleaning plant at McDougalls is very efficient, and their technical staff pay great attention to this stage of the manufacture, the laboratory and the mill work being in very close collaboration. On the occasion of our visit, a completely new screenhouse was in course of construction, and when all the new machines which we saw being erected are in operation, the wheat cleaning department will be particularly efficient.

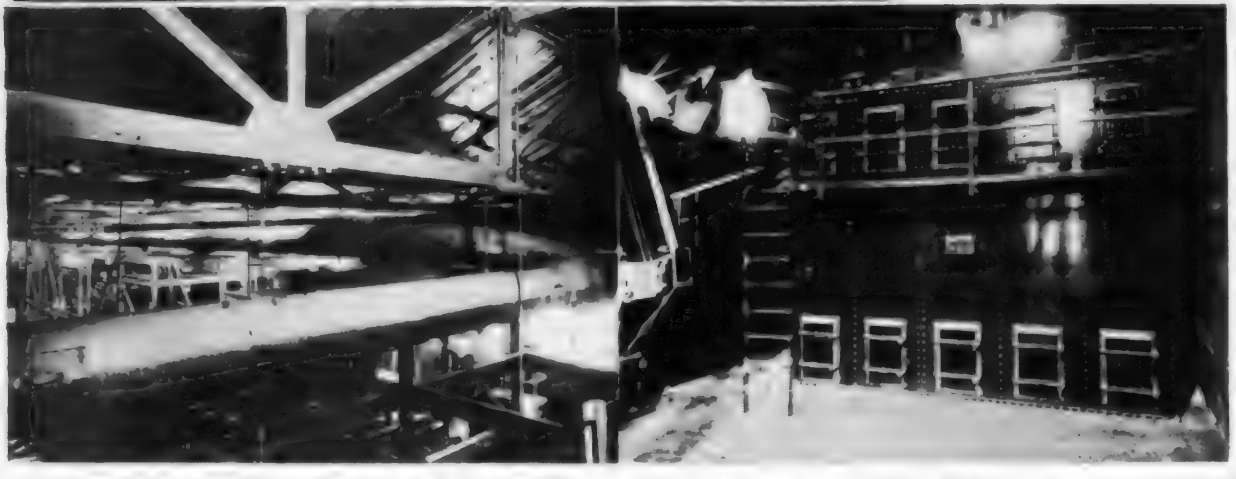
Flour Milling

The main principles involved in flour milling are breaks, where the grain is cracked and broken; scalping, which effects a separation of large and small particles; grading and purification, which separate the products into groups according to size of particle and remove fine offal; reduction, where the various particles of semolinas are crushed to the fineness of flour between smooth rolls; and finally, the dressing of the flour through fine silks. Among all these processes there occurs the removal of the germ, pollards, bran and middlings and the grading of stocks. In the breaks the wheat passes through corrugated rolls, the object of the corrugations being first to break up the berries and then, by gradual increase in the fineness of fluting, to scrape the bran as clean as possible. In the reductions the rolls are smooth, as the main object is crushing, not scraping. All rolls are exhausted for cooling purposes.

Conversion into Self-Raising Flour

This section of the manufacture comes under strict laboratory control. The laboratories, which are modern and equipped with the best apparatus available, are under the supervision of Mr. T. H. Fairbrother, M.Sc., F.I.C., who is also a director of the company. Mr. Fairbrother is well known to readers of FOOD MANUFACTURE on account of his articles on cereal chemistry and allied subjects. In the laboratories great stress is laid on the analysis of the raising ingredients which are calculated to McDougalls' own special formula. Of course, the usual care is taken in regard to arsenic, lead and other dangerous substances. The manufacture is controlled by

Part of the McDougall laboratories, where great stress is laid on the analysis of the raising ingredients, which are calculated to their own special formula.



The Visco Beth dust-collecting installation in McDougall's new self-raising flour plant. On the left is the main trunking, which runs over all the packing machines and other strategic points, and on the right, the equipment that purifies dusty air. By means of this dust-collecting plant, employees are enabled to work over the flour-packing machines in perfect comfort, without respirators.

a series of tests taken at frequent regular intervals day and night. The evolution of CO_2 is determined on each sample, and if this is satisfactory and the *p*H value normal, it is evidence that the sample contains the correct amount of raising ingredients.

Automatic Weighing

When the quantities of ingredients to be used are settled, the plain flour is conveyed from the bins to an automatic weigher. This is a three-component apparatus which weighs out flour and the ingredients. These weighers are synchronised, and if one develops any error the others are automatically thrown out of action. The amount of ingredient added is controlled by analysis, so that a given weight of flour will always yield the same amount of CO_2. This is a very important point and one which may be missed in the manufacture of self-raising flour not scientifically controlled. The flour and raising ingredients then pass to the horizontal high speed mixers of McDougalls' own design. After mixing, the self-raising flour is stored in bins.

Bulk Storage

A notable advance by McDougalls in recent times has been the introduction of bulk storage of flour. Nowadays, no flour at McDougalls is stored in sacks, so that the possibility of sack fluff and much insect contamination is eliminated. The flour bins are 55 feet high and are constructed of wood, lined with tin and fitted with special bin dischargers. The tin lining assists the flow of the flour and prevents infestation with insects, which would harbour in the cracks of the wood. From the bins, by conveyors, the flour is sent to the hoppers over the automatic packing machines. Sheets of paper are fed in by an automatic device at one end and sealed bags are delivered at the other. The flour is automatically weighed on triple weighers. Special packs which are not of sufficient magnitude to warrant the use

The Southall and Smith automatic weighing equipment, where the plain flour and raising ingredients are weighed and blended to produce a standard self-raising flour.

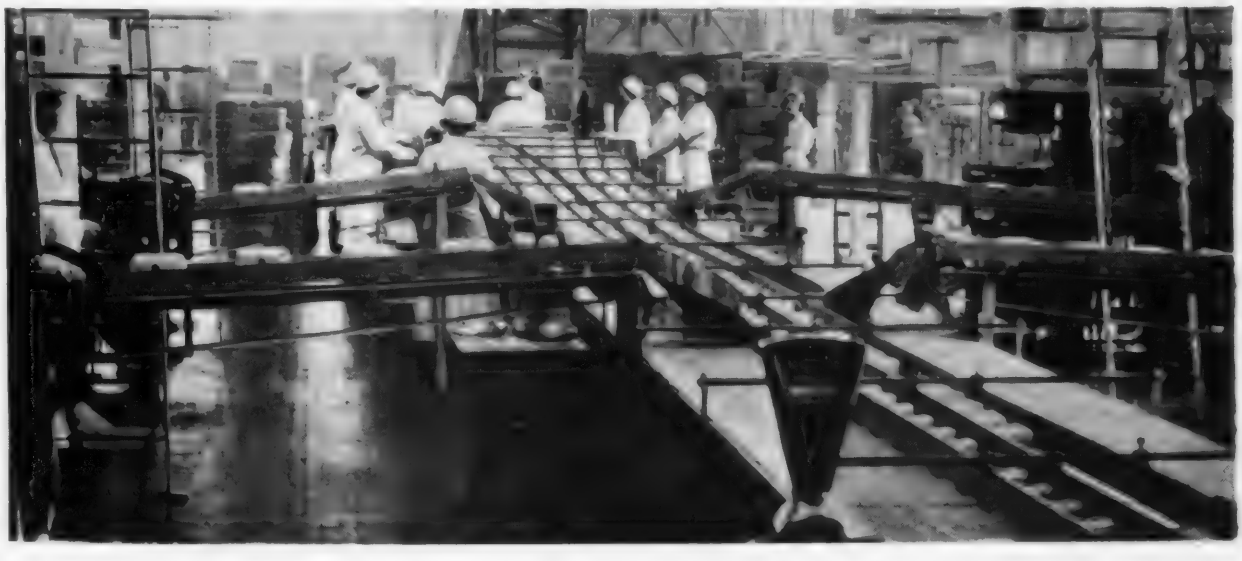
of an automatic packeter are packed in hand machines. Each packing machine is fitted with a dating device which indicates the date of manufacture on every bag, and service recorders which indicate what the machine is doing. McDougalls are experimenting with a check weigher which would automatically reject any bags that were short or over weight. The sealed bags are delivered from the six machines on to a central band conveyor built to McDougalls' own design. This is a very ingenious method of handling a continuous stream of bags of different sizes. The 3-lb. sizes are delivered into one stream and conveyed to their appropriate station, where they are packed into cartons containing 36 lb., and the other sizes are delivered to individual stations to be packed into cardboard cartons. These are all made on the premises. At one time most of the cardboard used for this purpose came from Germany or Canada, but English manufacturers have made such good progress that the majority now is of English origin. The boards are printed in distinct colours, each size being given a separate colour. This is of great assistance in handling the cartons later, as grocers and warehousemen associate the 1-lb. size with the colour of the printing on the carton and so on. The printing machine is of the latest design and is a two-colour machine. The boards are bent on a two-way rotary bender, slotted on the slotters and stitched on wire stitchers. The whole of the packeting machinery is hooded and all dust drawn along ducts and collected in a dust collector. The factory is so designed that, after packing, the flow of flour is by gravity. The middle floor is the storage floor and has been specially constructed to maintain a constant temperature and humidity. From this floor the cartons are despatched down chutes directly into lorries or railway trucks. Some idea of McDougalls' output is given by the fact that if the cardboard used in a year were spread out in sheets it would cover over 480 acres of ground!

The new packing factory is one of the most hygienic and up-to-date for handling pre-packed flour in the world. No effort has been spared in catering for the comforts of the workpeople. The packing girls have their rest room, sun lounge and dining room tastefully and comfortably furnished. Standard meals are not provided, but there is an up-to-date kitchen and a staff available for cooking any food brought by the girls. The lounge is equipped with a radio set and a gramophone and a large number of periodicals. Adequate lavatory, first-aid and cloak room accommodation has been provided, in addition to which two very pleasant gardens flank the buildings. It is a real example of progress and manipulative efficiency brought right up to date.

SOME SUPPLIERS TO McDOUGALL'S FACTORY

Job Day and Sons, Ltd.: *Automatic packing machines.* Henry Simon and Co., Ltd.: *Radiator system of wheat conditioning and other milling machinery.* Thomas Robinson and Co., Ltd.: *Bin dischargers, also wheat conditioners and other milling machinery.* Redler Conveyors, Ltd.: *Flour conveyors.* Southall and Smith, Ltd.: *Triple weighers, hand packing machines.* Lamson Engineering Co., Ltd.: *Central band conveyors.* Matthew Wylie and Co., Ltd.: *Two-colour printing machines.* Visco Engineering Co., Ltd.: *Dust collector.*

Part of packing floor showing the central conveyors of special design.



Dispersing Agents as Stabilising Media in Baking Powders

SIMON MENDELSOHN, Ph.C., F.A.I.C.

THE USE of inert amylaceous dispersing agents in baking powders is a universal trade practice to assure stability of these preparations over indefinite periods, or for reasonable duration of storage subject to adverse environment. Deleterious effects of unfavourable conditions, age, or both, upon baking powders, while generally evident on casual inspection, are ultimately reflected in restricted leavening efficiency. Indiscriminate exposure to unfavourable climatic variations invariably impairs the aerating ability of leavening preparations despite their ideal formulation, or the initial efficiency of intimately associated dispersing or stabilising constituents.

Selection of Agents

Judicious selection of dispersing agents must, through necessity, be based on comparison of their relative efficacy in the accessory capacity of imparting stability to leavening mixtures. All too frequently such media are accepted as mere "fillers" or "inert matter" without any critical consideration of their potentially useful functions, despite the fact that these constituents comprise from 30 to 40 per cent. or more of commercial baking powder formulæ.

Winton[1] and collaborators, many years ago, cited the contention of manufacturers of a California brand of baking powder containing neither starch nor other stabilising agent—to the effect that such ingredients were unnecessary to ensure keeping quality, provided the mixtures were properly prepared in a dry climate. In this instance the leavening preparation was deprived of advantages ordinarily accruing through the use of a dispersing agent, even though the accessory stabilising influence was deliberately ignored. A particularly reprehensible fraud perpetrated in the United States prior to enactment of federal food legislation was also reported by Winton and associates,[1] where ground rock had been used as a "filler" in a baking powder. This preparation, coming to the attention of the Connecticut Agricultural Experiment Station, was found devoid of starch or flour, and containing in lieu thereof 25·5 per cent. of mineral matter insoluble in strong acids and consisting essentially of magnesium silicates. Professor S. L. Penfield, of Yale University, subsequently identified the siliceous residues as a mixture of pulverised talc[2] and tremolite;[3] the latter, a species of hornblende, was at one time extensively mined in New York State and widely employed as a filler in paper manufacture. Tremolite under the microscope appears in sharp, needle-like splinters, and is an example of a hazardous adulterant in food in view of the possibility of attendant deleterious consequences. According to the United States official definition of baking powder,[4] the use of dispersing (or stabilising) agents is purely an optional prerogative of the manufacturer; alternately, the selection of these media, if desired, is specifically restricted solely to starch and/or flour. The distinct purposes of media capable of serving simultaneously as dispersing and stabilising agents may briefly be summarised as follows:

Purposes of Media

(1) Service as a diluent to ensure accurate dispersion of reactive constituents and thereby promote more gradual evolution and distribution of leavening gas (CO_2).

(2) Act as an absorptive medium for free moisture adventitiously incorporated into the powder during manufacture or assimilated in the course of storage.

(3) For partition effect to prevent intimate contact between the acid and alkali components, thereby minimising possibilities of premature reactions.

(4) To facilitate handling and "measuring" in the course of actual use.

(5) For the final adjustment of CO_2 content by dilution.

To serve these purposes with the highest degree of satisfaction and practical efficiency, a dispersing or stabilising agent should conform with the following requirements:

(*a*) Innocuous, and devoid of taste and odour.

(*b*) Readily available; commercially economical.

(*c*) White, or nearly so as possible.

(*d*) Capable of being dried and/or re-dried to any reasonable degree of moisture content.

(*e*) Afford preferential absorption and retention of adventitious moisture by diversion of same from other intimately associated constituents of a leavening mixture.

(*f*) Particle size to afford efficient coverage of potentially active ingredients.

(*g*) No detrimental effects upon baked goods.

(*h*) Provide satisfactory bulking tendencies.

(*i*) Inert toward other ingredients.

(*j*) Not readily susceptible to deterioration.

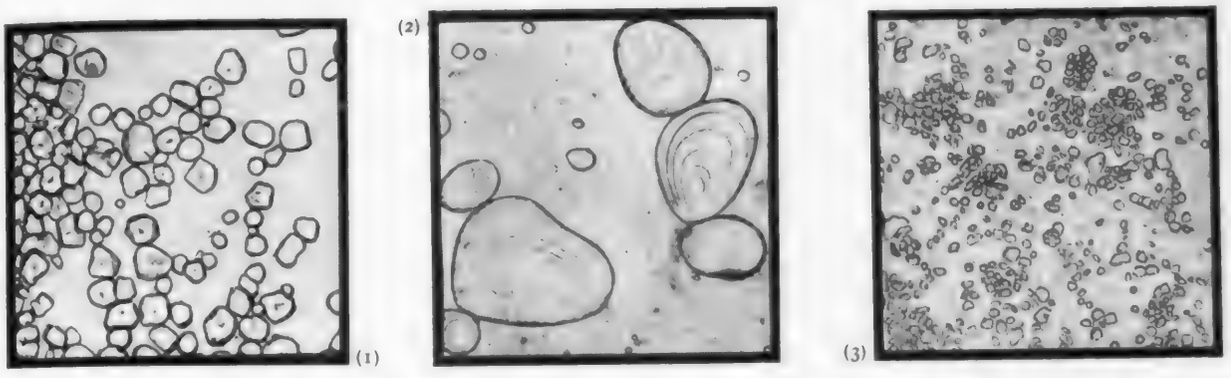
(*k*) Moderate or low natural hygroscopicity under reasonable circumstances.

Re-dried corn starch meets these requirements to an eminent degree, thereby serving as an efficient dispersing and stabilising agent for all practical purposes, and under conditions ordinarily compatible with the nature of baking powders in general. On the assimilation of moisture exceeding 10 per cent., a re-dried corn starch, for example, can no longer provide adequate protection to a baking powder over a protracted period. Progressive deterioration of the mixture is subsequently manifested by lumpiness, coincident with increasing deficiency in CO_2 content.

Moisture

The intrinsic purity of a commercial starch being assured, its hygroscopic moisture must accordingly be recognised as the selective criterion for its adaptation as a baking powder constituent. Re-dried corn starch to be employed as a stabilising agent should be characterised by a moisture content ranging from 6 to 9 per cent., the latter value to be considered the maximum of safety to assure leavening mixtures a reasonable opportunity to resist deterioration over customary duration of storage.

Inclusion of moisture in starch is initiated as a surface



These pictures show the starch granules of (1) Maize, (2) Potato, (3) Rice, (4) Wheat. Magnification × 250.

effect designated as adsorption, the term implying a tendency of colloidal aggregates or solids in general to condense gases or vapours (*e.g.*, H_2O) upon their surfaces. The extent of an adsorption phase is conditional upon surface area of exposed solid, temperature, pressure of vapour, duration of exposure, and specific characteristics of adsorptive and substance adsorbed. Subject to definite temperature and pressure, a solid adsorbs a certain quantity of vapour to a degree varying with increase or decrease in proportion with vapour pressure.

Adsorption of Moisture

Since rate of adsorption decreases concurrently with elevation of temperature, it follows that relatively low temperatures tend to accelerate their respective phases. This readily accounts for the comparatively small amounts of moisture accumulated by starch at relatively high temperatures; conversely, the storage of starch at low temperatures will obviously induce higher degrees of adsorption. Elimination of moisture from a colloidal aggregate consequently involves translation of an existing stage of equilibrium between surface of solid and vapour to a new phase in conformity with tentative variations in temperature, vapour pressure, and duration of exposure. Some writers consider adsorption of vapours upon porous solids as proceeding through more than one phase; Gustaver,[5] for example, assumes initial adsorption of vapour occurring at the surface or interface of a solid to be followed by condensation of adsorbate to the liquid state within the pores of an adsorptive. The penetration of adsorbed moisture into the deeper portions of starch masses may be recognised as the result of surface tension acting within a system of infinitesimal capillary channels provided by the fine grain structure of the porous adsorptive.

Extent of moisture assimilation in starch is accordingly a direct function of the adsorption isotherm for any specific phase. Adsorption and capillarity are parallel in effect in so far as an increase in temperature in either case induces a corresponding decrease in adsorption rate and surface tension respectively. The various starches are characteristically susceptible to adsorption and capillarity, owing to physical differences in density, form, and magnitude of granules.

Rakovski,[6] in studies of moisture accumulation in starches, ascertained that 66⅔ per cent. of the total water which a starch is capable of absorbing was assimilated within 24 hours, the remaining 33⅓ per cent. requiring 2 months for its absorption into the aggregate. Browne[7] investigated the water attraction of starch previously dried over phosphorus pentoxide in a vacuum desiccator by exposing samples to moist atmosphere at various temperatures and degrees of saturation. Rate of moisture accumulation being then determined, Browne noted starch at 20° C. and 60 per cent. relative humidity to exhibit maximum absorption during the first hour, the water vapour being absorbed with such avidity that heat was evolved during exposure of the dried material. Boehm,[8] also interested in the moisture absorption of starches, incidentally discovered that moist starch does not attract CO_2, while the dried granules absorb five or six times their volume of the gas, which is not entirely dispelled in vacuum. In this example of gas/solid adsorption, the CO_2 is eliminated completely from the starch only through contact with boiling water.

Gallay and Bell's Studies

Gallay and Bell[9] recently published results of their investigations of moisture absorption of several starches from the standpoint of relative efficiency as stabilising agents in baking powders. The writers, restricting their studies to potato, corn, and rice starches, as well as wheat starch of varying degrees of fineness, derived quantitative data providing a noteworthy contribution to the conspicuously meagre references in the literature regarding the use of these materials in leavening preparations. Comparative stabilising influences of these media upon tartrate, phosphate, and combination baking powders were determined through exposure of test samples to critical environments over periods varying

from several hours to 4 months. Different samples of the powders were exposed to controlled atmospheric moisture at 33, 55, 60, and 77 per cent. relative humidities for various periods, and subsequent deficiencies in CO_2 content noted. Correlation of data obtained by Gallay and Bell demonstrated the superiority of corn starch in the majority of cases under *practical* conditions simulating or approaching normal environment. Potato starch and coarse wheat starch exhibited no special features to justify or recommend their utilisation as stabilising agents. Wheat starch "fines" and rice starch, however, are characterised by certain properties commending their preference only in special instances. The latter two media, being composed of granules of similar magnitude, demonstrated their superiority to corn starch in stabilising efficiency only under stringent circumstances which for baking powders are rarely, if ever, encountered in ordinary usage. Due consideration of these factors, with the justification of assuming wheat starch "fines" and rice starch as one and the same medium by virtue of their identical particle size, accordingly warrants additional credit in favour of corn starch as a dispersing and stabilising agent in leavening preparations. The following tabulations summarise the results obtained by Gallay and Bell[9] in their studies with standard types of baking powders.

These writers contend that for comparative fineness of subdivision the order of stabilising efficiency of each of these starches is an inverse function of their average particle size.

Type.	*Examples of Superiority under Various Conditions.*	*Per Cent.*
Corn starch	7	54
Potato starch	None	—
Wheat starch	3	23
Rice starch	3	23

NOTE.—It is assumed in the examination of data that the forms of monocalcium phosphate—*i.e.*, fine and granular used in these tests by Gallay and Bell—contained a minimum of other phosphates of calcium, more or less hygroscopic as compared with $CaH_4(PO_4)_2.H_2O$; dicalcium and tricalcium phosphates are frequently present in comparatively large amounts either as diluents or accidental contaminants. These will accordingly tend to influence the degree of moisture absorption.

Instability of all types of baking powder is appreciably increased at relative humidity exceeding 40 per cent. With decrease of this factor, the variations in stabilising efficiency of the starches were constantly lessened until at 33 per cent. relative humidity all of the samples still retained 12 per cent. of total CO_2 after 4 months of continuous exposure. Household and commercial baking powders invariably contain corn starch for the purpose of imparting and maintaining dryness, but other media have from time to time been proposed as substitutes to afford innovational advantages. Many of these suggestions have been sponsored chiefly through purely academic interest, with no consideration accorded to practical advantages, commercial tenability, or economical expediency. Special features claimed by respective patentees for each of the numerous innovations proposed as substitutes for corn starch or wheat flour in baking powders facilitate their classification into definite but frequently inter-related groups. Most of the novel suggestions involve materials capable of imparting new features concurrently with their ability to serve as dispersing agents, diluents, and stabilising media. Much of the following data has been reviewed in periodical and patent literature; in the majority of cases the innovations have never progressed beyond the experimental stage. Under the circumstances, the protection of patent laws has been invoked primarily to secure and validate priority of claims in anticipation of future technical developments.

White Flour

White flour as a stabilising agent, while permissible under the United States Standard and Definition of Baking Powder, but rarely if ever used at this time, may induce results comparable with those of other media only for limited periods, due to certain factors introduced through inherent characteristics of wheat flour. This material consists essentially of 70 to 75 per cent. of starch, the residual 25 to 30 per cent. being composed of fats, cellulose, mineral matter, carbohydrates other than starch, together with moisture and traces of natural acidity due to acid phosphates. The presence of free organic acidity, chiefly lactic, in flour denotes deterioration incident to ageing, the acidity being rapidly augmented under adverse conditions of storage. Marion,[10] investigating effects of storage upon flours, noted an increase of acidity during the first year, followed then by a gradual decrease in the second year. This reversal was subsequently attributed to the probable formation of ammonia in consequence of progressive decomposition of the cereal proteins; Balland[11] assumes an increase of organic acid content of aged flours to develop at the expense of fatty matters originally present. Regardless of the cause of acid development, the drying of a flour to a low moisture content for possible utilisation in baking powder manufacture may accordingly increase organic acidity, if present, through concentration of bulk, to such a point as to possibly render the material unsuitable as a stabilising or dispersing agent over any protracted period. One of the earliest systematic investigations of the hygroscopic properties of wheat flour was conducted by Richardson[12] in the United States.

(*To be continued.*)

REFERENCES

[1] Connecticut Agric. Experiment Station, *Annual Rep.*, Pt. 2, Food Products (1900).
[2] Soap-stone; natural hydrous magnesium silicate, $H_2O.3MgO.4SiO_2$, with variations.
[3] A white or grey variety of amphibole; essentially a calcium-magnesium silicate, $CaMg_3(SiO_3)_4$ and other forms.
[4] United States Definition and Standard, Food Inspection Decision, No. 174, February 26, 1918.
[5] Ware, J. C., *Chemistry of the Colloidal State*, N.Y. (1930).
[6] *Chem. Abstracts*, 6, 2876 (1912), through Walton, R. P., *Comprehensive Survey of Starch Chemistry*, vol. 1, New York (1928).
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[11] *Loc. cit.*
[12] U.S. Dept. Agric., *Bureau of Chemistry Bulletin*, No. 4 (1884).

MODERN ANGLO-AMERICAN CAKES

Their manufacture described by J. Stewart

A variety of Anglo-American cup cakes.

THE MODERN developments in cake making technique made possible by the introduction of hydrogenated shortenings and special cake flours has aroused much interest in the bakery trade, especially since the last September exhibition, when a special exhibit of these cakes was made by American confectioners. Both flour milling firms and fat manufacturers, as well as many private confectioners, have in recent years been making extensive research into cake making methods, so much so that many bakers have had to alter their original ideas on cake production and what constitutes good cakes which the public will appreciate. These firms have set out on the immense task of teaching our cake makers how to produce better cakes at a lower cost than was previously possible. Those who saw the American section of cakes last year at the exhibition will undoubtedly be on the look out for further varieties at this year's exhibition at the Royal Agricultural Hall. Special competitions for these cakes are being held by interested fat merchants. The impressive fact about these American type of cakes is that although they do not appeal to the eye so much as our own type of cake, their eating and keeping qualities are remarkably good. They are of good flavour; moist to eat, and keep their moistness for a considerable time.

Another thing that impresses the English confectioner is the combination of very fine textured cakes with a home-made finish on them. There are many confectioners who are now producing similar cakes all over the country and finding a ready sale for them.

Ingredients

To those who have not commenced to make these new types of cakes it must be pointed out that to be successful in manufacturing a wide range of goods that are quite new to their customers an entirely new technique of cake making is necessary. The older methods of cake making, utilising well-known formulæ, have to be superseded, and new recipes with special ingredients and special methods have to be employed.

Flour millers and flour importers now provide a specialised type of cake flour which, because of its very fine milling, will carry the extra sugar and moisture required by the new types of recipes. The fat producers have been making use of the latest scientific knowledge and research on the hydrogenation of oils into fats to produce for confectioners those special plastic fats which are necessary to produce the American type of cakes. A good hard-grained castor sugar is invariably necessary in the best type of cakes, although for dark coloured cakes a Barbadoes or Demerara sugar is desirable. A good brand of frozen eggs is generally used. These are carefully defrosted and warmed to about 70° to 75° F. before use.

It is always necessary to use milk, even in the best cakes. The milk generally used is the dried variety of skimmed milk, but it should be reconstituted by using at least 1 lb. of milk powder per gallon of water at least 2 hours before use. Egg colour is generally added with the milk, using ½ lb. liquid egg colour per gallon of milk to ensure sufficient coloration.

Flavourings such as essences of madeira, vanilla, raspberry, and strawberry, or oil of lemon or orange are used. Salt is also a necessary ingredient to improve the flavour of the cakes, and the baking powder should be the best obtainable.

Temperature Important

One point that requires stressing with regard to the ingredients is the necessity of having them at an equitable temperature. Bread makers know how completely the fermentation process is ruled by using the thermometer. In ordinary cake making we know that unless the batters are sufficiently warm we cannot get good cakes. In making the Anglo-American type of cakes it is most necessary to use the thermometer and maintain a predetermined temperature throughout the process, as this ensures the standardisation of the manufacturing process. There should also be a stated time for beating the materials at the various stages of manufacture. If the fats are cold they are in a more plastic condition, and require a longer period of agitation to increase the temperature through the friction between the beater and the ingredients, so that the batter will become properly aerated. When batters are overheated by using too warm materials or by overbeating, the fats may become oily and the air cells constantly break down by collapsing, and bubbles of air will rise through the sloppy batter. Therefore it is best to maintain all the ingredients at about 70° F. in order to be able to standardise the process and time of manufacturing at particular speeds.

Methods of Manufacture

The methods used in the manufacture of American cakes vary with the type of cake required. It is generally best to stick closely to the methods advocated by the firms who supply the special fats and flours, who are willing to supply special formulæ for each type of cake. It will be found that rule of thumb methods are of little use in obtaining consistent products. Standardisation of methods, and particularly of ingredients, prevents wastage of materials and time and renders possible more accurate costing.

The first method advocated by those who sponsored the new type of cake was the "creaming process", since it was realised that new methods of cake making would not take well when introducing a new type of cake with new ingredients. By so doing the fat manufacturers gradually got the cake manufacturers interested in their fats, and they gradually introduced the blending methods they now advocate.

When making American type cakes by this method the first operation is the blending of the fat, sugar, flour, salt, etc. The aim should be to secure a complete distribution of the special shortening on to the surfaces of the particles of sugar and special flours. There is no advantage to be gained in prolonging this preliminary mixing. The time usually required is 4 minutes on low speed or 60 r.p.m. This should not make a paste of the ingredients. The mixture should be well scraped down at this stage. There are different methods of adding the liquid ingredients, but the usual method advocated is to add half of the total mixed eggs and milk to make a stiff paste and give it a good mixing, usually about 4 minutes on low speed. Scrape the bowl down again. The remaining liquid ingredients are added last and a further 5 minutes' mixing is given on low speed. The volume of the finished cakes depends to a large extent on the final period of mixing. Appearance at this stage is not much guide to the quality of the final cakes. If it is undermixed, a poor volume and close crumb will be the result. If it is overmixed a "woolly" crumb with excessive volume will be obtained. The first trial batch will show if any adjustment of mixing time is required.

Baking the Cakes

When the cake batters are completed they must be weighed into standard sized tins and carefully baked. It is general to have the oven slightly warmer than one would expect for cakes with a high sugar content, and the cakes bake quicker than one would expect, since they contain so much moisture. An oven at about 380° F. will generally give the best results. If the cakes are baked too slowly, sugary tops will develop and the cakes will be too tender. Rapid baking will give a tough, pinched appearance. The cakes, when baked, feel soft and more velvety than ordinary cakes, and one may be tempted to give them a few more minutes, but the only result would be to reduce the volume of the cakes. It is not necessary to paper the hoops for these cakes, but to grease and flour them, as there is a slight retraction of the cakes during baking. When baking is completed the cakes are removed from the hoops or pans and cooled quickly, in order to retain their flavour and character.

Yellow Layer Cakes and Sandwiches

Here are two typical recipes that can be used to produce batters suitable for layer cakes or sandwiches:

	No. 1.	*No.* 2.	
Special cake flour	10 lb.	10 lb.	Mix on low speed for 4 minutes. Scrape down bowl and give another turn.
Baking powder	6 oz.	6 oz.	
Hydrogenated fat	7½ lb.	5 lb.	
Sugar (castor)	13 ,,	14 ,,	Add to blended mass and mix for 5 minutes, scraping down at least once.
Salt	4 oz.	4 oz.	
Milk	2½ lb.	3 lb.	
Eggs	7½ ,,	7 ,,	Scale off eggs, milk and flavour, mix together, and add approximately half to the batter.
Milk	5 ,,	5 ,,	
Flavouring	To taste	To taste	

Anglo-American sandwich and cup cakes finished with fudge and cream icings.

The photos in this article are by courtesy of the American Society of Bakery Engineers.

Mix until smooth, scrape down, and add the remainder of the liquid. Continue mixing for a total of 5 minutes at this stage, scraping down again to ensure a smooth batter. Total mixing time, 14 minutes.

The batters should be scaled at 10 oz. into 6-inch sandwich tins or hoops and baked about 380° F.

The cakes, when cooled, can be finished off quite simply with the new type of cream or fudge icings, or they can be decorated like ordinary English gateaux, or sold as they are.

Confectioners would be quite justified in using the fudge or cream icings, because these are easy to make, having an attractive appearance, and are nice to eat. They are easily applied, and one can get quite novel effects with them which will attract potential customers.

White Fudge Icing

The following recipe and method can be used to produce a white fudge icing, or it may be coloured and flavoured as required to get other effects:

Milk	1¾ lb.	Dissolve together and heat to 160° F.
Hydrogenated fat	1½ ,,	
Sifted icing sugar	9 ,,	Place sugar, salt, and flavour in a bowl, add the warm stock, and mix until smooth.
Salt	¼ oz.	
Vanilla essence		

This will make 12¼ lb. of icing.

When using, the icing should be kept warm and softened to spreading consistency with hot milk or water.

Chocolate Fudge Cakes

Chocolate flavoured cakes suitable for layer cakes or sandwiches are becoming very popular, and these can be quickly and easily produced, using the following recipe:

Chocolate Fudge.

Fondant	4 lb.	Melt chocolate, add fondant and stock syrup and mix until smooth, and cool ready for use.
Unsweetened chocolate	2 ,,	
Stock syrup	2 ,,	

Chocolate Cake Batter.

Special cake flour	9 lb.	Mix for 4 minutes on low speed and scrape down once bowl and beat, then give another turn.
Baking powder	4 oz.	
Hydrogenated fat	5½ lb.	
Chocolate fudge	8 ,,	Add to mixture and mix on low speed for 2 minutes. Scrape down bowl and beat.
Sugar	8 ,,	
Salt	4 oz.	
Milk	6 lb.	
Vanilla flavour		
Eggs	8 lb.	Add to batter and mix for 2 minutes, scrape down and mix another 2 minutes on medium speed.

Keep ingredients at 70° F. Total mixing time, 10 minutes.

Scale the batter off as required into the different sized pans and bake at 380° F. Do not overbake.

These cakes can be sandwiched with a good chocolate cream and decorated with a good chocolate fudge icing.

Chocolate Fudge Icing

A chocolate paste is first made up for flavouring icings and fondants, using the following recipe:

Hydrogenated fat	2½ lb.
Cocoanut butter	1 ,,
Invert sugar	2 ,,
Cocoa powder	4½ ,,
Salt	½ oz.
Vanilla flavour.	

It is always necessary to use milk, even in the best cakes. The milk generally used is the dried variety of skimmed milk, but it should be reconstituted by using at least 1 lb. of milk powder per gallon of water at least 2 hours before use. Egg colour is generally added with the milk, using ½ lb. liquid egg colour per gallon of milk to ensure sufficient coloration.

Flavourings such as essences of madeira, vanilla, raspberry, and strawberry, or oil of lemon or orange are used. Salt is also a necessary ingredient to improve the flavour of the cakes, and the baking powder should be the best obtainable.

Temperature Important

One point that requires stressing with regard to the ingredients is the necessity of having them at an equitable temperature. Bread makers know how completely the fermentation process is ruled by using the thermometer. In ordinary cake making we know that unless the batters are sufficiently warm we cannot get good cakes. In making the Anglo-American type of cakes it is most necessary to use the thermometer and maintain a predetermined temperature throughout the process, as this ensures the standardisation of the manufacturing process. There should also be a stated time for beating the materials at the various stages of manufacture. If the fats are cold they are in a more plastic condition, and require a longer period of agitation to increase the temperature through the friction between the beater and the ingredients, so that the batter will become properly aerated. When batters are overheated by using too warm materials or by overbeating, the fats may become oily and the air cells constantly break down by collapsing, and bubbles of air will rise through the sloppy batter. Therefore it is best to maintain all the ingredients at about 70° F. in order to be able to standardise the process and time of manufacturing at particular speeds.

Methods of Manufacture

The methods used in the manufacture of American cakes vary with the type of cake required. It is generally best to stick closely to the methods advocated by the firms who supply the special fats and flours, who are willing to supply special formulæ for each type of cake. It will be found that rule of thumb methods are of little use in obtaining consistent products. Standardisation of methods, and particularly of ingredients, prevents wastage of materials and time and renders possible more accurate costing.

The first method advocated by those who sponsored the new type of cake was the "creaming process", since it was realised that new methods of cake making would not take well when introducing a new type of cake with new ingredients. By so doing the fat manufacturers gradually got the cake manufacturers interested in their fats, and they gradually introduced the blending methods they now advocate.

When making American type cakes by this method the first operation is the blending of the fat, sugar, flour, salt, etc. The aim should be to secure a complete distribution of the special shortening on to the surfaces of the particles of sugar and special flours. There is no advantage to be gained in prolonging this preliminary mixing. The time usually required is 4 minutes on low speed or 60 r.p.m. This should not make a paste of the ingredients. The mixture should be well scraped down at this stage. There are different methods of adding the liquid ingredients, but the usual method advocated is to add half of the total mixed eggs and milk to make a stiff paste and give it a good mixing, usually about 4 minutes on low speed. Scrape the bowl down again. The remaining liquid ingredients are added last and a further 5 minutes' mixing is given on low speed. The volume of the finished cakes depends to a large extent on the final period of mixing. Appearance at this stage is not much guide to the quality of the final cakes. If it is undermixed, a poor volume and close crumb will be the result. If it is overmixed a "woolly" crumb with excessive volume will be obtained. The first trial batch will show if any adjustment of mixing time is required.

Baking the Cakes

When the cake batters are completed they must be weighed into standard sized tins and carefully baked. It is general to have the oven slightly warmer than one would expect for cakes with a high sugar content, and the cakes bake quicker than one would expect, since they contain so much moisture. An oven at about 380° F. will generally give the best results. If the cakes are baked too slowly, sugary tops will develop and the cakes will be too tender. Rapid baking will give a tough, pinched appearance. The cakes, when baked, feel soft and more velvety than ordinary cakes, and one may be tempted to give them a few more minutes, but the only result would be to reduce the volume of the cakes. It is not necessary to paper the hoops for these cakes, but to grease and flour them, as there is a slight retraction of the cakes during baking. When baking is completed the cakes are removed from the hoops or pans and cooled quickly, in order to retain their flavour and character.

Yellow Layer Cakes and Sandwiches

Here are two typical recipes that can be used to produce batters suitable for layer cakes or sandwiches:

	No. 1.	*No.* 2.	
Special cake flour	10 lb.	10 lb.	Mix on low speed for 4 minutes. Scrape down bowl and give another turn.
Baking powder ..	6 oz.	6 oz.	
Hydrogenated fat	7½ lb.	5 lb.	
Sugar (castor) ..	13 ,,	14 ,,	Add to blended mass and mix for 5 minutes, scraping down at least once.
Salt	4 oz.	4 oz.	
Milk	2½ lb.	3 lb.	
Eggs	7½ ,,	7 ,,	Scale off eggs, milk and flavour, mix together, and add approximately half to the batter.
Milk	5 ,,	5 ,,	
Flavouring ..	To taste	To taste	

Anglo-American sandwich and cup cakes finished with fudge and cream icings.

The photos in this article are by courtesy of the American Society of Bakery Engineers.

Mix until smooth, scrape down, and add the remainder of the liquid. Continue mixing for a total of 5 minutes at this stage, scraping down again to ensure a smooth batter. Total mixing time, 14 minutes.

The batters should be scaled at 10 oz. into 6-inch sandwich tins or hoops and baked about 380° F.

The cakes, when cooled, can be finished off quite simply with the new type of cream or fudge icings, or they can be decorated like ordinary English gateaux, or sold as they are.

Confectioners would be quite justified in using the fudge or cream icings, because these are easy to make, having an attractive appearance, and are nice to eat. They are easily applied, and one can get quite novel effects with them which will attract potential customers.

White Fudge Icing

The following recipe and method can be used to produce a white fudge icing, or it may be coloured and flavoured as required to get other effects:

Milk	1¾ lb.	Dissolve together and heat to 160° F.
Hydrogenated fat ..	1¼ ,,	
Sifted icing sugar ..	9 ,,	Place sugar, salt, and flavour in a bowl, add the warm stock, and mix until smooth.
Salt	½ oz.	
Vanilla essence		

This will make 12¼ lb. of icing.

When using, the icing should be kept warm and softened to spreading consistency with hot milk or water.

Chocolate Fudge Cakes

Chocolate flavoured cakes suitable for layer cakes or sandwiches are becoming very popular, and these can be quickly and easily produced, using the following recipe:

Chocolate Fudge.

Fondant	4 lb.	Melt chocolate, add fondant and stock syrup and mix until smooth, and cool ready for use.
Unsweetened chocolate	2 ,,	
Stock syrup	2 ,,	

Chocolate Cake Batter.

Special cake flour ..	9 lb.	Mix for 4 minutes on low speed and scrape down once bowl and beat, then give another turn.
Baking powder ..	4 oz.	
Hydrogenated fat ..	5½ lb.	
Chocolate fudge ..	8 ,,	Add to mixture and mix on low speed for 2 minutes. Scrape down bowl and beat.
Sugar	8 ,,	
Salt	4 oz.	
Milk	6 lb.	
Vanilla flavour		
Eggs	8 lb.	Add to batter and mix for 2 minutes, scrape down and mix another 2 minutes on medium speed.

Keep ingredients at 70° F. Total mixing time, 10 minutes.

Scale the batter off as required into the different sized pans and bake at 380° F. Do not overbake.

These cakes can be sandwiched with a good chocolate cream and decorated with a good chocolate fudge icing.

Chocolate Fudge Icing

A chocolate paste is first made up for flavouring icings and fondants, using the following recipe:

Hydrogenated fat	2½ lb.
Cocoanut butter	1 ,,
Invert sugar	2 ,,
Cocoa powder	4½ ,,
Salt	½ oz.
Vanilla flavour.	

Melt the shortening and cocoanut butter, then add the invert sugar, and heat until the mixture is 150° F., when the cocoa powder and salt are added. Thoroughly mix the whole mass and flavour with vanilla.

The chocolate fudge icing is prepared from this paste, using:

Chocolate paste	5 lb.
Warm water	2 ,,
Sifted icing sugar	13 ,,

Add the warm water to the warmed chocolate paste, and mix until the water is thoroughly incorporated. Add the sifted icing sugar to this dilute chocolate mass and beat until the whole is smooth and glossy, then apply to the chocolate cakes.

White Layer Cakes

The American white layer cake is becoming increasingly popular. White layer cake is not new, but it is new to this country. Many have tried to make these cakes and failed, because they probably did not understand the process. White cakes are also made by the blending process, and are specially suitable for producing delightfully new effects in layer cakes because one can get true colouring in cake layers, since there are no egg yolks used to give a natural yellow colour. The colours used give their natural tones, and pleasing colours are obtained which are greatly enhanced by the fine silky texture of these cakes.

The recipe and formula recommended for use in the manufacture of these cakes is as follows:

Hydrogenated fat ..	4 ,,	Mix on slow speed for approximately 4 minutes. The ingredients should be well blended and free from lumps.
Castor sugar	11 ,,	
Salt	¼ ,,	
Cream of tartar ..	1½ oz.	
Baking powder ..	6 ,,	
Special cake flour ..	12 lb.	
Egg whites	6 lb.	Dissolve the sugar and mix all together. Add about half to the mixture and mix for 4 minutes on low speed. Scrape down bowl and beat, add the remainder and mix for a further 4 minutes on low speed.
Milk	7½ ,,	
Invert sugar	1 ,,	
Flavour as desired		
Colour if required		

This mixture can be used for slabs, sheet cakes, cup cakes or sandwiches. After the batter is made up, the batter, or portion of it, may be coloured if desired. The ingredients should be kept at about 70° F. for the best results. If small cakes only are being made, the baking powder can be increased to 8 oz. The baking temperature should be slightly less than for yellow cakes of the same size.

The extra cream of tartar is used to ensure complete neutralisation of the bicarbonate of soda and so prevent discoloration of the crumb.

Madeira and Layer Cakes

The confectioner may use these modern fats and special flours to produce the ordinary English types of cakes with good results. The following table of recipes is one that I have compiled for use when using plastic fats and special cake flours:

Ingredients.	1.	2.	3.	4.	5.
	Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*
Fat	14	14	14	14	14
Sugar ..	20	20	24	28	32
Salt	½	½	½	½	½
Eggs	20	16	16	16	16
Flour ..	20	20	24	28	32
Baking powder	—	¼	⅜	½	⅝
Milk	3	7	10	14	18
Flavouring ..	1/16	1/16	1/16	1/16	1/16
Total weight	77½	77¾	88⅞	101	113⅛

These recipes can all be made upon the sugar batter process of cake making. Cream the fat, sugar and salt for 5 minutes, gradually adding eggs and creaming for another 5 minutes on medium speed, then scraping down the bowl and beat, and continue for a further 2 minutes on medium speed. The remaining ingredients are added and mixed on low speed for 2 minutes to clear thoroughly. Total mixing time, 14 minutes.

The batters can be used to produce cup cakes, sandwiches, sheet cakes or pound cakes, etc.

A table of recipes for pound fruit cakes and queen cakes has also been tabulated for use with these special fats and flours:

Fruit Cakes and Queen Cakes

Ingredients.	1.	2.	3.	4.	5.
	Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*
Fat	14	14	14	15	14
Sugar ..	22	22	24	24	26
Salt	½	½	½	½	½
Eggs	20	16	16	15	16
Milk	3	6	8	11½	12
Flour ..	24	26	28	30	32
Baking powder	⅛	¼	⅜	½	½
Mixed fruit ..	40	24	24	24	24
Flavouring ..	1/16	1/16	1/16	1/16	1/16
Total weight	123⅛	108⅛	114⅞	120½	125

These recipes are made up into batters, using the same formulæ and timing as is given for the plain cakes. The fruit is added after the flour and milk has been mixed for 1 minute.

The cakes so produced by this method have extraordinarily good volume and an excellent flavour, texture and appearance. The cakes are moist eating and do not stale quickly, and those who now make them speak of their great popularity with the consumers. They are light and delicious to eat as well as being nourishing. The general consumer does not find them too sweet, because of the fluffy light crumb.

The progressive confectioner will find them profitable, quick-selling lines which the public will appreciate.

The Need of a National Research Association for the Baking Industry

J. VALENTINE BACKES, A.R.C.Sc., A.I.C., D.I.C.

INDUSTRY TO-DAY has a tendency towards combines and amalgamation—collective or centralised operation as opposed to individualism. Those who favour the former will claim that amalgamation tends towards efficiency—giving the public what they want at the most economic price, and (what is the real claim) by reason of centralisation or combining of capital as well as technical labour, be in a position to undertake new developments and so bring about what is known as industrial progressiveness. There is, of course, a good deal of truth in such claims, and it may be fundamentally true to say industry and those engaged in it are morally bound to give the public the best at the cheapest price—and that "best" must be progressive.

But the backbone of British industry is the individual—the one-man business. While it is right to say the public are entitled to the best at the cheapest price, it is also just to say that industry must support its members. How, therefore, is the individual—the one-man business—to meet the claim made upon him compared with the big amalgamations?

The Word "Efficiency"

Take the first point, efficiency—a word first introduced into industry when industry had its back to the wall during the Great War and science was called in to aid production—a word often used but seldom understood by capital and labour alike.

Efficiency is not the mechanisation of industry—the replacement of man by machine. The machine's place in industry is to assist man—not to replace him. The true definition of efficiency is the production of the finest goods in the easiest and most logical way with the minimum amount of effort, the machine supplying the "brawn" and the man supplying the "brain". If the machine can save time the first claimant to that saving is the workman, and industry should be so organised as to be able to pass on this saving without effecting its economic stability. It is only on a conception such as this that man and machine can retain their rightful place in industry.

The main point in this definition of efficiency is the doing of the job "in the easiest and most logical way with the minimum amount of human effort". In other words, the elimination of unnecessary labour—the cutting out of redundant operations—the working to plan rather than to rule of thumb. It is not essential to be a combine or a big organisation to adopt this, but the first lesson to be learned is that the success of all the big concerns in any industry is their adoption of this fundamental. Are we, in the baking industry, satisfied that all our operations are efficient? Is there no room for industrial psychology?

Industrial Psychology

Industrial psychology is not directed to speeding up. It is primarily concerned in getting the job done better with less effort. The so-called speeding up, or, shall we say, greater output, follows as a natural result. A considerable amount of time and labour could be saved in the baking industry if more consideration were given to the planning of the bakery and the housing of raw materials. For example, how many minutes are lost and miles walked in a year as a result of keeping utensils and raw materials just out of reach of the operative? Due attention should be paid to the accessibility of sinks; constant hot water for washing of utensils; easily cleaned tables and troughs. Careful attention to stock control and the taking of deliveries in reasonably sized quantities allows the manufacturers to keep down freight charges and so pass it on to the baking industry in the form of reasonable prices. All these points save a fraction of this all-important "production cost" to the baker, and it is the sum total of these fractions which is the dividing line between profit and loss—between efficiency and inefficiency.

Every member of industry, be he combine or individual, can plan production—can adopt this industrial psychology. Thus on this score the individual—the one-man business—is at no disadvantage to the combine or big business.

Where the disadvantage does arise, however, is on this question of progressiveness. The combining or pooling of capital and technical labour does enable the undertaking of industrial research, which owing to its cost is deprived from the individual. Is this state of affairs good for industry? Research can be wasteful if not properly organised and if the results are not made available in understandable language and properly applied. Industrial research to be economic is too big a thing for any one section or member. The problem of the one is, or may be, a problem of many, and to have a number of industrial research units working in their own watertight compartments on the same problem is not aiming at efficiency or for the good of the whole industry.

Industrial research must first solve the fundamental

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problems of the industry, and having done that then there is room and place for individual and competitive research. And if the fundamental problems of the industry are solved the solution should be available to every one of its members for its betterment.

Lack of Research

The progressive development of the baking industry is retarded and handicapped by lack of research. Every product on the market should carry with it that progressive improvement equivalent to the time it has been on the market. How is it that the motor, the radio, and the artificial silk industries have made such progress in our time? Would we buy a "crystal" set to-day? Yet how we admired it less than twenty years ago! Would we buy a 1930 car to-day? Progressive improvement brought about by industrial scientific research has given us something better and because it is better we buy it. The industries which can give this "something better" have the first claim on the fixed family budget. The baking industry must be alive to this scramble for not only its share, but an increased share of this all-important fixed family income.

The first step is to solve its own fundamental problems in production. To learn more about its raw materials; to devise new methods of utilisation of new products; to find out what type of raw materials it requires and to tell the producers of these materials the standards to which they must work.

These problems are common to the whole baking industry—not just to a section or class. The first step, therefore, is the establishment of a Bakery Research Association, an association with its own well-equipped laboratories and staff of chemists supplied and maintained by the industry. An ideal—but an ideal which can be put into practical effect if only the majority of the members of the baking industry and its allied trades are prepared to give it support. An annual subscription of as little as 10s. from the small baker, increasing *pro rata* for the larger firms, would bring a very effective Research Association into being, and, provided the industry is prepared to do its share, a national grant from the Scientific and Industrial Research Department would be obtainable.

The baking industry—the most important section of the food industry—is one of the few that has not its own Research Association, yet it is still content to sit down and complain about loss of trade to competitors who continue to obtain an ever-increasing share of the family budget.

Research, well organised on an industrial basis, is the finest investment any industry can make. What can research do for the baking and confectionery industry? Take the four major raw materials—flour, sugar, fat, and eggs.

Flour

How many members of the baking industry know of the valuable work being carried out by the Millers' Research Association? They are working constantly with the object of producing a better flour, investigating the incidental difficulties and overcoming the many troubles which have been common to the industry in the past. Should not such valuable information be available in an easily understandable form to every member of the baking industry, who, after all, is the primary user of the product? Until, however, some co-ordinating link is established, it seems that much of this very valuable work being carried out is being lost to that section of the industry which wants it most. The real point here is to see that such information is passed over in as simple and non-technical phraseology as possible, so that each individual baker can grasp the information which has been derived as a result of fundamental research and apply it to his everyday work.

The baker complains of his flour—but can he say where it is wrong? Is not his complaint more in the nature of a discontented "grouse" rather than a genuine complaint? He knows what he wants but cannot define it; he therefore falls back on comparisons and those very wide and elastic terms "strong", "weak", "poor", or "good". Let the baker give his Research Association a sample of what he calls a "good flour" and a sample of what he calls a "poor flour", and then let them work on finding out the fundamental characteristics of each—not only from the producer's but from the user's point of view.

In this way co-ordination and a fuller and more profitable use to the baking industry can be made of the valuable work being done by the Millers' Research Association, so that every individual baker, large or small, may possess practical information of direct use in his daily work.

Sugar

The work of the Cocoa and Chocolate and Sugar Confectionery Research Association has brought to light the enormous variations in what we all thought to be a very simple material.

Defects which have worried the sugar confectionery industry for years have now been traced to the variation in sugar, and research has now supplied the confectionery manufacturer with information which has not only overcome difficulties in his everyday job, but has saved thousands of pounds to the industry. One piece of information alone passed on by the Research Association to its members brought about economy which saved every member an amount several times greater than the subscription paid—just on sugar! Has this variation in sugar any bearing in the baking and confectionery industry? It certainly has in many of the allied sections, particularly in the manufacture of lemon and other flavoured curds, marshmallow, cream fillings, icing sugar, and the like. Is the baking industry (and by that I mean every individual baker, because it is he in the aggregate that forms the industry) alive to these facts, and is it getting the help it should?

Fat

Until quite recently fat was "fat", judged on standards such as "feel", "taste", and "brand". The producers gave the baker what they, the producers, thought was best, but, owing to lack of baking research, the baker was not in a position to define just what he really required to give best results. Thus the industry

stood still in this country until about two years ago, when we first heard of what is now known as "American type cakes".

To many, "American type cakes" means just a formula or recipe, but there is something more in it than that. It is a perfect example of the practical outcome of bakery research.

In America, the manufacturers of bakery fat realised that the users were the bakers, and hence investigated the product from their angle. They found first of all that fats had a tendency to flavour (generally adversely) the goods in which they were used, owing to breaking down by oven heat. Thus a bakery fat for preference should be absolutely stable at all temperatures and neutral in flavour. Again, they realised that tenderness of the crumb of the cake was an all-important factor controlling the baker's repeat order. Tenderness of crumb was to a large extent controlled by the beat of the batter —the more beating, the smaller were the air cells and the thinner the cell walls. Small air cells controlled texture and moisture retention—the shelf life of the cake.

The baker noticed all these factors, but was never able to continue beating after the addition of the eggs because the batter "broke down" and curdled. A bakery fat must have a high emulsification factor and be able to take in liquor and allow beating without curdling. It was facts such as these, obtained by scientific research, that enabled the American bakery fat producers to produce a product to give the baker what he wanted. Having done that, the research was carried a stage further, and new methods and new formulas to give better results and better cakes were devised. It is these new formulas which are appearing daily that have the name "American type cakes", but basically they are the results of co-ordinated industrial scientific research practically applied to the baking industry.

Eggs

The egg is a natural product, and constitutes the most complex and most delicate of the bakers' raw materials.

Is the baking industry getting the best results from this essential ingredient?

The frozen product is by far the most used type. Production and methods of freezing are all-important factors, and a considerable amount of brain and money has been invested in producing a first-class product, but is it realised that methods of defrosting and temperature for use can increase or decrease batter volume by a marked extent? If one starts with a good product, surely it is to the betterment of industry to have the fullest information as to the best methods of handling? Batter volume, texture, flavour, are factors in which the baking industry is directly concerned.

The more one studies the problems of our everyday job, the more we realise how little we really know. Industry must be progressive, and to be progressive it must undertake research. The small man as well as the big man must uphold the prestige of his industry. Competition when conducted on a quality basis is good for industrial development, but it is not the competition *from within* but the competition *from without* to which the baking industry must take heed.

The circulation of the money of the nation is controlled by the family budget. As the nation's prosperity increases the family income, the baking industry must see to it that it gets its fair share of that increase by creating demand and bringing that money which might filter to other industries whose creation of demand and attractive progress is greater.

The establishment of an Industrial Research Association for the baking industry would help its members to bring about and maintain the standard which its importance as a section of the food industry demands.

A NATIONAL ASSOCIATION FOR BAKERY RESEARCH?

Some Opinions

The Editor.

SIR,

You have asked me for my views on a National Research Association for the bakery trade, and for what they are worth I am pleased to give them to you.

In the first place, I am, and always have been, in favour of research in any industry, but just what form that research should take and how it should be organised is a different matter. I must say that I am not very much enamoured of the idea of a national research association as a sole solution to the troubles of the bakery trade. Suppose one were started and periodic reports were issued in scientific terms to the trade, how many bakers would read them and of those how many would understand them?

To my mind, every baker of any magnitude should have his own chemist and laboratory, and it would be a poor chemist who could not effect economies sufficient to justify his existence. If the baker has his own chemist, then the existence of a National Research Association is justified. The chemist will be able to interpret the research reports in terms recognisable by his chief and to apply them to the individual needs of his own particular business.

I do not favour a multiplicity of research organisations all ploughing separate furrows. In the case now under consideration, it is obvious that the interests of the bakers and millers are interwoven and will never be separable. Why not, therefore, a joint research association? There is in existence at St. Albans a research association for the milling industry. Why not make this a joint research station for both milling and baking trades? The final criterion of any flour is the baking test and at St. Albans there are ample facilities for baking tests and plenty of room for expansion. The interests of the miller are essentially those of the baker. The miller, naturally, wants to supply to the baker exactly what the latter requires, but unless the baker will say what he wants he can't blame the miller if he doesn't get it. Do the bakers know what they want? I doubt it. A joint research association would assist greatly in this direction and I feel it would be of benefit to both industries.

Yours,

BLACKHEATH. T. H. FAIRBROTHER.

TWO MORE VIEWS ON BAKERY RESEARCH

The Editor.

SIR,

The need for a National Research Committee for the baking industry is a matter of primary importance to the industry. At several periods during the past ten years I have outlined schemes which might be started for the attainment of this end. A research institute incorporating the following departments would help to meet the many needs of the trade, and from such a list it will be readily appreciated how much a separate organisation is required apart from other research organisations already in existence, such as the Millers' and the Food Manufacturers' research organisations.

RESEARCH INSTITUTE

(a) *Department of Technical Research* to investigate methods of manufacture and work out new processes.

(b) *Department of Scientific Research* to investigate problems of a fundamental scientific nature which already exist and which would arise as research proceeded.

(c) *Analytical Section* to deal with the examination of new materials introduced to the trade. This section would not act as a cheap testing bureau for the trade.

(d) *Statistical Section* to collect data and figures connected with the trade and to include problems of costing.

(e) *Library and Information Bureau* to deal with all trading and reference works as well as publication of such in trade journals.

(f) *Liaison Department.* This department to consist of outside staff who would go among the trade giving practical help, interpreting new ideas and collecting problems for further investigation.

The financing of such an institute is the most difficult matter, but a levy of a penny per sack of flour would provide ample funds for the carrying out of such a scheme.

EDMUND B. BENNION.

NATIONAL BAKERY SCHOOL,
BOROUGH POLYTECHNIC,
LONDON, S.E. 1.

The Editor.

SIR,

It is probably correct to say that the average baker does not know much of the work done by the Millers' Research Association, and also that many are not able to translate the results into use in the baking industry.

There can be no doubt that the ideal to be strived after by the baking industry is a National Research Association working for the betterment and in the service of all members of the industry. Whether it should work independently of the Millers' Research Association or in collaboration with it is another matter. I think we should work in collaboration with them in so far as many of the problems they are out to solve are also bakers' problems, but we must have a bigger research into the effect and use of other materials that are of less interest to millers but are of greater importance to the bakers.

Our main raw materials are flour, fats, sugar, eggs, milk, yeast, almonds and fruit. The flour millers have their M.R.A. The fat manufacturers do a vast amount of independent research into the uses of their fats and pass on some useful information to the users of their products. Sugar manufacturers should also be interested in research work as far as it affects their products. Egg factors should be more than interested in bakers' research work, as there is much need for research into the effect of using eggs at varying temperatures and varying times of whisking. Milk factors are also interested in finding more uses for milk products and their effect in baking. Yeast manufacturers are also interested in research work and many have their own small research station. Almond product manufacturers are also interested so far as the uses of these products are concerned. Lastly, fruit factors should have a certain interest in the uses of their products in the industry.

If one could co-ordinate all these varying interested parties into one association and call it a National Research Association for the Baking Industry and make sure that the whole aim and object of such an association was for the betterment and service of all members of the baking industry, it would be the grand ideal to be aimed at and would save much duplication of effort that goes on at present.

The great difficulty would be to get the various interested sections to co-operate, but that is where the bakers' associations should come in if they were sufficiently well organised. They could direct the work of the research association, using the other allied parties as the feeding ground or financiers to gather the funds from their products to finance a research institute for bakers, which, under proper direction, could build the baking industry up to heights never thought of before.

If such an association is to work for the benefit of all concerned in the industry it must be financed according to ability to pay, and the fairest method of raising the finances appears to be that of adding a small percentage to the value of all goods sold by the allied traders to bakers. If 0·5 per cent. was added to all bakers' accounts for the benefit of a research association, it would spread a light burden over everyone concerned and there would be sufficient finance to build up a research institute that we would be proud of.

Yours faithfully,
J. STEWART.

Steam Sterilisation of Apple Boxes for Blue Mould

PICKING boxes which have been used for one or more seasons are recognised as sources of *Penicillium expansum* spores. This contamination has been found to increase from year to year, and only by disinfection can the number of viable spores be kept at a low level. The use of sprays of sodium hypochlorite with about 0·25 per cent. available chlorine has been suggested for effective disinfection of picking boxes and packing equipment.

However, work by Richard H. Wellman and F. D. Heald, communicated in Bulletin No. 357 of the State College of Washington, Agricultural Experiment Station, has shown that steam sterilisation would seem to fit well into commercial practice.

The paper in question gives full details as to the experiments carried on, and the final findings of the authors are as follows:

(1) A direct exposure to streaming steam for one minute is sufficient to kill a very high percentage of the spores of *Penicillium expansum*.

(2) Spores that have been dried for two weeks are more readily killed by streaming steam than those which have been dried for a few hours only.

(3) Spores mixed with decayed apple tissue in contact with apple-box wood are more difficult to kill with streaming steam than spores free from decayed tissue.

(4) Spores between two pieces of wood, as in joints, are somewhat protected from the action of streaming steam, but under the experimental conditions were killed within two minutes.

(5) Spores of *Penicillium expansum* on artificially contaminated and on naturally contaminated box wood did not differ appreciably in their resistance of streaming steam.

(6) In commercial practice a two-minute exposure to streaming steam of old picking boxes, which are to be used again, would be sufficient to kill all blue mould spores present.

TECHNICAL DEVELOPMENTS IN THE CONFECTIONERY TRADE

EDMUND B. BENNION, M.Sc., Tech.A.I.C.
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THERE ARE periods in the development of all trades when progress is rapid and almost revolutionary, whilst for the intervening periods it is merely evolutionary.

The past year has not been one for any revolutionary changes in procedure or practice in the baking industry. Trading conditions have been particularly difficult, partly owing to the rising costs of raw materials, so that attention has had to be focussed particularly on costings in order to keep the balance sheets on the right side. Since so many articles are sold at unit prices, it has been extremely difficult to maintain the production of these lines on a profitable basis.

Confectionery Standards

The need for standards in articles of confectionery continues to exercise considerable interest, and although the judgments obtained in the "cream cake" cases have been favourable towards the trade, there is still considerable uneasiness among the trade and public analysts at the continued use of the word "cream" in the generic sense as a part name of confectionery products. The longer the practice of calling any cakes "cream cakes" which possess a creamy filling is continued and recognised, the more difficult will it be ever to change it should it be considered desirable. If a survey were to be made of the number of large firms using fresh dairy cream in their cakes as compared with those using manufactured cream, the figures would be illuminating. The profits made by the manufacturers of artificial creams give an index to the quantity of these creams now used in confectionery products.

The use of the word "butter" in connection with the nomenclature of cakes has come up for consideration on more than one occasion, and warnings have been issued as to the amount which should be used if the word butter is to be used in this connection, yet recently a case against vendors of so-called butter biscuits which contained all vegetable fat was dismissed on the grounds that butter could not be used since the use of it would cause the biscuits to go rancid. In this particular case it looks as though the biscuit company were fortunate that no expert evidence was called against their statement. Most people do believe that butter biscuits contain butter; likewise, if a cake is stated to contain butter, the public expect that a goodly proportion of the fats used is butter. Lack of any acknowledged standard leads to many difficulties in so many articles of food. The standard of 4 per cent. non-fatty solids has been generally accepted for chocolate cakes, and although it is one suggested by a body outside the flour confectionery trade it has been almost universally adopted. There are many better class confectioners using a much higher percentage, and if a really good chocolate flavoured cake is required a much higher percentage is essential. Recently, interest has been aroused over the amount of saffron in a saffron cake. At one time such cakes had a very pronounced flavour and deep colour and contained a relatively high proportion of saffron, but changes in the public palate have brought about the use of much smaller quantities until, as inevitably occurs, the time apparently came when mere traces were used. There are many products which through the course of time have changed so drastically that their original composition has been entirely altered, while their exterior appearance remains the same. A special Standards Committee might well be formed by the trade to define standards for confectionery so that only such correct products should bear their appropriate name. All other imitation and spurious products would then need to find another name not likely to mislead the public. Further, such a committee would define standards for raw materials to the advantage of both the confectionery trade and the manufacturers. In this connection the use of the term "marzipan" for so many types of almond products or substitute products serves as a classic example.

New Style Cake

The development of the use of hydrogenated shortenings proceeds, but at a rather slower rate than was anticipated by many who entered the field of manufacturing such fats. Development of cake sales of the high ratio type of cake has been found most satisfactory, however, when a modified form of American formula has been used, and there are many confectioners doing very useful trades along these lines.

Angel cake has been seen on sale in many of the multiple stores, and has been proved a successful item in many districts in London and elsewhere. It is a cake which has been made successfully by the wholesale cake manufacturers, and has proved useful as a sixpenny line

Slab and layer cakes using a white cake base.

Courtesy of the American Society of Bakery Engineers.

for packing and display and, moreover, because of the lightness of the product, a profitable new line.

It will take time to get the British palate accustomed to this new cake, but gradually a transition is likely to occur. Semi-hydrogenated fats are being marketed as well as the fully hydrogenated type. These are quite suitable for the Anglicised form of American cake, and are proving more popular than the fully hydrogenated types at the present state of development of the trade.

Whipping Cream

The transition from hand to machine whipping of cream was a logical one once machines became general to bakeries. Then followed the special air whisks in which the whipping of the cream was brought about by compressed air, producing an aeration by directing air currents through specially designed slots and orifices in a specially designed container.

Attachments for ordinary cake machines were next designed, the aim in all cases being to secure more efficient aeration and the maximum volume increase. Now comes an entirely new project. Cream can be whipped without the normal mechanical whisking equipment and without the incorporation of air. In this process it is claimed that the gas cells are produced within the body of the cream and not by agitation. The gas used is nitrous oxide, which has a high solubility, and when used in the quantities necessary for aeration it is without physiological action, although in much higher concentrations it is used as an anæsthetic in dentistry. The apparatus to be used to produce the whipped cream consists of a small steel syphon of one pint capacity. This is designed to facilitate easy cleaning and sterilisation. Half a pint of cream is introduced and the bottle is closed. The nitrous oxide gas is passed in through a Schrader valve under pressure, with the result that the gas dissolves in the cream, and remains so as long as the pressure remains unchanged. The amount of gas which dissolves depends on the pressure used. On opening the valve, once the gas supply has been disconnected, the cream begins to flow out, and as it passes through the valve the pressure falls to normal atmospheric pressure, with the result that the dissolved gas comes out of solution and forms gas cells uniformly distributed throughout the body of the cream. From such a container as small an amount of cream as desired can be obtained at any time and the cream can thus be used as desired. It is claimed that by this method over half a pint of cream will produce three and a half pints of whipped cream, the increase in volume being independent of the fat content of the cream. The stability of such a product is very different from whipped cream produced by mechanical means, and it would seem that it would resemble the whipped cream sold on the Continent to be eaten as such with cake or fruit rather than a firmer product used as filling for cakes. The method is full of interest, however, and, modified, may find some application in this country.

Flour Quality

Most of the millers in this country have been introducing cake flours to work satisfactorily with the hydrogenated shortenings, since the success of these shortenings in producing high ratio cakes depends entirely on the quality of the flour. The American millers have studied the production of these flours for many years, and by the careful selection of wheats and the very fine milling of the products, scientifically controlled and bleached so as to have a definite hydrogen ion concentration, they

produce flours of regular quality which can be relied upon. In this country the same quality has not been generally attained. There are one or two flours which are good, but the majority are only near the mark and will not compare favourably with the American flours. It will be necessary for more work to be done by individual millers if the cake flour market is to be captured and retained by them.

Research in Methods

So far as research into cake-making methods has been concerned, there has been much work conducted in the service laboratories of many allied traders, from which work new formulæ have been evolved. The stability of cake batters and emulsion foams and prevention of breakdown due to curdling has been investigated by Emily Crewe and her co-workers in America. They have found that with hydrogenated shortenings the cake emulsion becomes less stable as the hydrogen ion concentration decreases, and more stable as the hydrogen ion concentration increases. Viscosity increases very slightly in either direction from that at a *p*H value of from 7·6 to 7·3.

With butter or butter oils the stability of the emulsion increases with low hydrogen ion concentrations, with increasing hydrogen ion concentration there is a decreased stability, but at *p*H 6·3 there is an increase in stability. Throughout the work there was a close relation between stability and viscosity. The practical importance of such work can be appreciated when it is realised how easy it is to correct the hydrogen ion concentration of batters by the use of varying amounts of acid components in baking powders or by the addition of acid as fruit juices or extracts which might also serve for flavouring purposes.

Great interest has been shown in fermentation research on the action of glutathione on gluten, since this substance is present in wheat germ, and since the specific action of germ on gluten is considered to be due to this, it is only natural that attention should be paid to it. In this country there has been work carried out on its use, and it is likely that in the future, if short processes of fermentation become more imperative, then practical application of this work will result, and particularly in connection with the production of fermented morning goods.

In America there has been an official Committee of the American Association of Cereal Chemists dealing with cake baking and self-raising flours, and they have been working on the effect of formulæ and procedure variables upon the quality of cakes prepared by a laboratory method and the comparison of the effect of formula variables using the official method and the laboratory method. The conclusions arrived at were those commonly known in this country many years ago. They speak of sugar tolerance of flours, which is of greater importance than has been generally realised in this country in the past.

Further work in America deals with judging cake quality by the ability of a piece of cake to take up water. The extent to which a piece of cake can do this is considered to be a measure of its eating qualities. Those which are difficult to wet are generally considered to be dry eating in the mouth. Such conclusions are very open to question, or, at least, call for much more detailed definitions.

An example of modern American baking propaganda. The many times during the day when cookies are acceptable are shown in the silhouetted figures indicating activities. Below are some attractive packages of cookies.

FAT COMES FROM FOOD

FIVE BOOKS ON DIET

Obesity. By W. F. Christy, M.D. Pp. 204. London. 12s. 6d. net.
Ideal Weight. By W. F. Christy, M.D. Pp. 110. London. 5s. net.
Modern Dietary Treatment. By M. Abrahams and E. M. Widdowson. Pp. 328. London. 8s. 6d. net.
Tropical Nutrition and Dietetics. By Lucius Nicholls. Pp. 164. London. 7s. 6d.
Human Nutrition and Diet. By W. R. Akyroyd. Pp. 256. London. 2s. 6d. net.

THE unfortunate carrier of excess adipose tissue should be gratified at the amount of interest that is taken in him by experts on the subject. The general opinion is that the importance of maintaining the human body in the form of shape conferred on it by the Creator is obvious to all students of disease; nevertheless, adiposity has been much neglected. Most fat persons, at one time or another, have tried to lose weight by themselves, but have failed from lack of knowledge or sustained effort. A painstaking perusal of some or all of these books will certainly provide the knowledge, although the second condition, sustained effort, is probably as difficult as the acquirement of the knowledge.

Dr. Christy has written two books; the first, **Obesity,** is described as a "Practical Handbook for Physicians," and in it he has analysed his own case records of the last 200 obese subjects treated in private practice. He is very insistent on the fact that, whether an endocrine background exists or not, fat comes from excessive intake of fuel foodstuffs. There is a wide difference of opinion concerning the ætiology of obesity. While Gardner Hill and Levy Simpson consider that almost all cases of obesity have an endocrine origin, Dr. Christy inclines to the opinion of Hunter and Dunlop that the majority are due to an excessive intake of food. Dr. Christy has divided the exogenous factor into two sections: (1) the dietetic factor, which is made up of (*a*) too much food, (*b*) the wrong foods; and (2) the food-spending factor, divided into (*a*) faults of basal metabolism and (*b*) the faults of voluntary movement. Under the endogenous factor are discussed disorders of the weight-regulating mechanism, which are divided into (I) faults of liver function, (II) faults of endocrine function, and (III) faults of nervous control.

The chapter devoted to clinical features is full and well documented, as are the chapters on diagnosis and prognosis.

The second part of the book, which is devoted to treatment, gives some useful specimens of reducing diets, and some 104 pages of the whole book are devoted to the calorific values and protein, fat and carbohydrate contents of almost every common article of diet and beverage.

Evidently Dr. Christy was of the opinion that a great deal of the information contained in his book should be made available to the layman, and **Ideal Weight,** "A Practical Handbook for Patients," is the result of culling freely from his former book, with a view to making it digestible to the layman. Dr. R. E. Tunbridge, in a lecture at the Leeds Public Dispensary, pathetically mentioned that one can never rely on the patients' remarks concerning their daily diet. "How often," he says, "has he been told, 'Doctor, I am a poor eater,'" and that, while obese patients eat little at mealtimes, they are always nibbling between meals. He points out that when one realises that a 2-oz. bar of chocolate, one pint of beer, the most polite of afternoon teas—a buttered scone, a piece of cake, and a cup of tea—have a calorie value of approximately 300, and that as the daily requirement of the average person is only 2,500 calories, it needs very few "snippets" to yield an excessive intake of food. He also deplores the fact that patients have little idea of food values, and that our present social conditions and customs are both factors in inducing overeating. With either of Dr. Christy's books, by means of their clear tables, calorific delinquencies may be traced from dawn to eve with the minimum of trouble! There is a peculiar delight attached to the realisation by a person undergoing, say, a diet restricted to 2,000 calories that at the end of the day he or she has 300 calories in hand (*i.e.*, that his intake has only been 1,700 calories), which means that the imbibing of a half-pint glass of stout or three tots of whisky would bring the day to a virtuous close.

It was rather surprising to read under "Vitamins" that "several of these are known to exist, although the chemical composition has not been discovered. For want of knowledge, therefore, these have been labelled *a, b, c, d,* and there are others which are just as essential to life and health." In view of the present knowledge of vitamins and the date 1938 on this book, we feel that Dr. Christy has concentrated much more on calories than he has on vitamins.

In **Modern Dietary Treatment,** 1937, Miss M. Abrahams and Miss E. M. Widdowson have, according to the foreword by Drs. G. Graham and R. D. Lawrence, "set out to make the new knowledge of nutrition available for practitioners, nurses, and dietitians in a simple and practical way. The book is divided into three main parts, the first dealing with the general principles of dietetics, the second with the different diseases for which dietary treatment is necessary and explains the reasons for the type of food employed, and the third gives full details and examples of diet suitable for patients suffering from these diseases." The analyses of the foods are those which have recently been carried out and published under the auspices of the Medical Research Council. This work should constitute a valuable handbook for whom it is written, and there is much in it to interest the layman, although he would better content himself with Dr. Christy's popular book.

Dr. Lucius Nicholls, in his **Tropical Nutrition and Dietetics,** attempts to do for tropical climates what the other books have done for the temperate ones. He sets out to collect the salient points of nutritional work done in several tropical countries along two lines: firstly, the study of the less cogent results of dietary deficiencies which has brought to light the prevalence of many signs, symptoms, stunted growth, etc., and the diets in use among general populations and the chemical analyses and biological assays of foodstuffs. In presenting the subject of tropical nutrition to the medical man, the author has presupposed his ignorance of the general principles of the subject and has attempted to cover rather too much in the space of a short work. No doubt the hints on prescribing diets among the poorer classes and the analyses of the foods available to such people are useful to the busy practitioner, but the present reviewer doubts the usefulness of full-page representations of formulæ such as those of β carotene and vitamin A. The absence of a bibliography is a defect that may be more apparent than real when it is considered that the medical man who works among the masses in the tropics must have little time or opportunity for full study of the literature.

The final book in my list, **Human Nutrition and Diet,** is by W. R. Akyroyd, M.D. This is one of the series of Home University Library, and is frankly written for the layman. Here we have the familiar tables of the different foodstuffs with their contents of protein, fat and carbohydrate, and so the book goes through the familiar gamut, except that the economics of diet is given generous consideration, as would be expected from the fact that Dr. Akyroyd is a late member of the Health Section of the League of Nations.

T. C-W.

NEWS FROM THE INDUSTRY

Stiff Sponges and Soft Sponges

A laboratory study of the effect of stiff sponges and soft sponges on bread quality, bread staling rate and *p*H was undertaken by J. A. Shellenberger, Mennel Milling Co., and Thomas A. Catlan, Walton Baking Co., Toledo, Ohio.

The detailed results of the experiments, including four tables and two charts, are included in a four-page bulletin, No. 111, just released to the membership of the American Society of Bakery Engineers.

This paper was a continuation of the work presented by Tom Catlan at the meeting in March on the same subject.

One of the conclusions drawn from the experimental work is that bread made from stiff sponges has a higher score value than bread made from soft sponges.

A copy of the four-page bulletin may be obtained on request from the secretary, Victor E. Marx, 1,541, Birchwood Avenue, Chicago, if a stamped addressed envelope is enclosed.

* * *

At the Exhibition

William Gardner and Sons (Gloucester), Ltd., makers of the well-known "Rapid" ("mixes an ounce with a hundredweight or more") sifters and mixers and other machinery for the food industry, bakers and confectioners, grocers and manufacturing chemists, will be exhibiting on Stand Bay 18, Ground Floor, Royal Agricultural Hall, Islington, London, N., for the Bakers' Exhibition from September 3 to 9, and the Grocers' Exhibition from September 17 to 23; and also at the Chemists' Exhibition from September 19 to 23, Stands 17, 18 and 19, Block D, Royal Albert Hall, Kensington, London, S.W.7, where directors and representatives will be glad to welcome old friends and any other readers.

* * *

"Chix"

Harry Peck and Co., Ltd., manufacturers of "Chix" chicken broth cubes, have changed their pack to a cube-shaped tin, which is more effective for display purposes than the old flat pack. The inside of the lid duplicates the design on the outside, and a small tongue on its black flange supports it when open. The neat shape conveys an impression of the product, and the tin is decorated in blue, yellow and white. The pack was designed by "Metal Box".

Grouse Flown Abroad

Grouse shot in Scotland on the "Twelfth" were rushed south by special plane on that day, put on an Imperial Airways flying-boat and despatched to Empire countries in time to be eaten on the day after leaving Southampton.

Such high-speed distribution of freshly shot grouse in the Empire has never taken place before. This enterprising scheme was organised by the Savoy Hotel, London.

When the grouse were flown from Scotland on the "Twelfth" by Railway Air Services, a special staff were standing by at the hotel ready to receive them. After being cleaned and stuffed with charcoal to ensure "keeping", they were wrapped in heather and taken to Southampton to catch the 5 a.m. flying-boat the next day.

By noon on Sunday they were delivered at an hotel in Cairo, 2,450 miles away, and hotels in Nyeri and Durban, South Africa, 5,000 and 7,200 miles respectively, received their supplies two and three days later.

* * *

Institute of Physics

The Annual General Meeting of the Institute of Physics was held recently. The following were elected to take office on October 1, 1938: *President*, Dr. C. C. Paterson; *Vice-President*, Mr. T. Smith; *Honorary Treasurer*, Major C. E. S. Phillips; *Honorary Secretary*, Professor J. A. Crowther; *New Members of the Board*, Dr. J. D. Cockcroft and Mr. E. B. Wedmore.

Sir Frank Smith, Secretary of the Department of Scientific and Industrial Research, was elected an Honorary Fellow.

* * *

Competition for Coconuts

The Ceylon Coconut Board has offered a handsome silver cup, of the value of 25 guineas, as a prize in a competition for sweetmeats containing desiccated coconut, shown at the Chocolate and Confectionery Exhibition, Earl's Court, 1938.

The cup will be awarded to the sweetmeat which, in the opinion of the judges, is the best entry in this class, and in assessing points for merit the judges will take into account the value offered to the public in relation to both quality and price.

Full details of this interesting competition are given in a leaflet issued by the Board.

* * *

Universal Metal Products, Ltd., are in new premises at Langley Road, Pendleton, Salford, Lancashire. Telephone numbers are Pendleton 1631-32-33.

* * *

Economic Changes in the Cameroons

Germany's demand for the return of her former colonies directs attention to the changes which have taken place since they passed out of her possession. These changes have occurred particularly in the sphere of economics, in regard to which Mr. Patrick Balfour, the author and traveller, writing in the June number of *The Geographical Magazine* on "The Cameroons", brings forward some interesting facts.

"The principal agricultural product of the Cameroons before the war, amounting to half the total exports, was wild rubber," states Mr. Balfour. "Palm oil came second and cocoa third. The largest plantation areas were on the slopes of the Cameroon Mountains, now in the British sphere. To-day the principal export from those areas is bananas, formerly of small account, followed by cocoa and palm oil. In the French area the principal agricultural product is palm oil, followed by cocoa. Rubber to-day is a negligible export, but the cultivation of coffee is developing and the export of timber has increased."

* * *

Laboratory Machinery

The cereal laboratory is the place where the crushers, grinders and sifters made by W. M. Fuller, Junr., and Co. have long been used. Leaflets giving full details of this "Breakell" series of machines are issued free by the concern.

An all-gas confectionery bakehouse with two double-deck peel ovens and one double-deck drawplate oven, made by Baker Perkins.

(*Courtesy British Commercial Gas Association.*)

Steam Trapping

The problems of steam trapping on food manufacturing steam-driven plant are dealt with in a series of bulletins issued periodically by Walker, Crosweller and Co., Ltd. No. 1 dealt with the draining of steam jacketed pans, and the latest one we have received, No. 3, surveys the methods of heating kitchen equipment sterilisers. This free series of helpful booklets must indeed be of interest to the food manufacturer's maintenance staff.

* * *

Heat Transfer

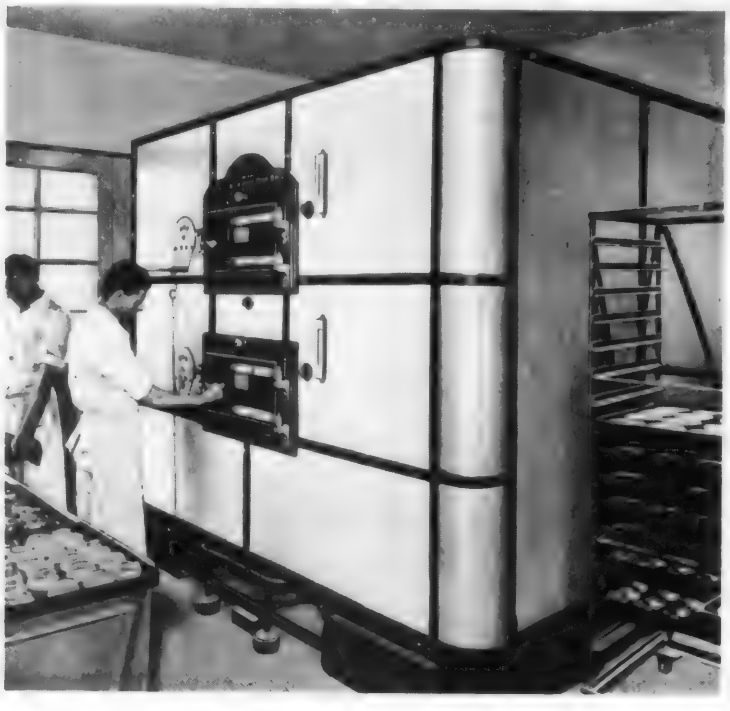
"Dowtherm, an eutectic mixture of diphenyl and diphenyloxide, is used in heat transfer systems usually in the vapour phase and has its chief applications over the temperature range of 210° to 400° C." The foregoing is from a leaflet issued by Frasers of Dagenham, who have arranged with the Dow Chemical Co. of U.S.A. for the sole selling rights of Dowtherm plant in this country.

* * *

Official Railway Station Handbook

A revised edition of the official *Handbook of Railway Stations* has been prepared and is now ready for issue by the Railway Clearing House. The book consists of 654 pages, contains upwards of 50,000 entries, and gives among other data, an alphabetical list of stations, sidings, collieries, junctions, works, etc., on the railways of Great Britain and Ireland, together with the county in which each is situated and the exact geographical position.

A test baking oven made by Henry Simon, Ltd. It has automatic temperature control and is used chiefly for fermentation and proving.



Two-Decker

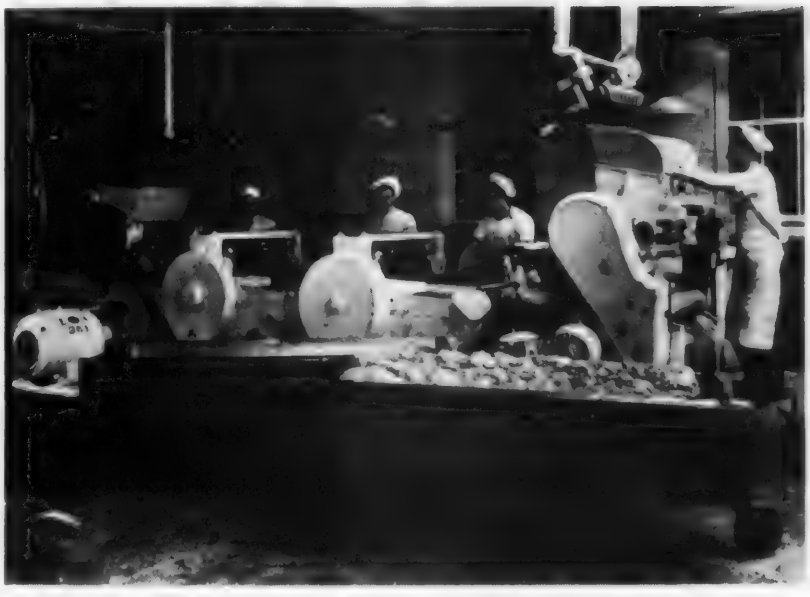
This two-decker oven supplied by Cox Ovenbuilders, Ltd., is a 6′ × 6′ (inside measurement) Super Heat Trap Gas Fire Oven. It is used for all classes of work, but mainly for pork pies. It has rounded corners, which are a great benefit to the bakers when passing to and from the oven. The gas is lighted from the front, and the control of the oven is simplicity itself. It eliminates all stoking, carting in of coke, and the atmosphere of the bakehouse is kept comfortable for the bakers to work in.

Revolutionary Baking Oven

The first of their type to be installed in any factory—a great advance on existing systems. Such are the claims put forward by Melvin and Gillespie, Ltd., for their new electric drawplate ovens. They are heated entirely by radiant heat, without any flame whatever, thus excluding dust and dirt and having complete decontamination inside the oven.

The ovens are arranged with automatic and hand operated heat control.

One of the new baking ovens described above.



Bogies lined with Monel sheet used in making biscuits at Carrs of Carlisle.

(Courtesy of Mond Nickel Co., Ltd.)

Colour Appeal

Natural colour reproduction, showing for the first time on the Metal Box Company Stand at the Chocolate and Confectionery Exhibition, will be the results of years of research by this company on natural colour photography and colour printing. Close co-operation between designer, colour photographer and printer has achieved results of rare distinction. In many cases only four printings have been used, which brings the process within the reach of practically every print buyer.

A similar policy is noticeable on the section for vacuum packs. The advantages of vacuum packing for atmosphere affected products are obvious. "Metal Box" are showing how this is economically within the reach of all by their process and using their packs.

One of their vacuum packing machines will be demonstrated on the stand. It can be operated with unskilled labour. One manufacturer is at present using this process for a product which retails at threepence.

The "Metal Box" Air-Sealed Diaphragm Tin for confectionery, with its protective inner seal for guarding the purity of the contents right to the consumer, will also be on display. Its increasing use in other trades besides confectionery has proved its popularity with the public.

Other features of the stand will be a double-seaming machine in operation and a range of new designs in decorated tin boxes.

* * *

Ozone for Food Factories

The question of air purification is an important one in connection with the handling, storage, and manufacture of food of any kind. In addition to the necessity of avoiding corruption in the food actually sent out, there is the question of losses due to having to jettison material which is not up to standard, and also the avoidance of disagreeable odours which have a definite effect on the efficiency of the operating staff.

Not only does this apply to large organisations where, in most cases, air treatment receives due consideration in the layout and planning of the factory, but it is equally important for smaller manufacturers and dealers in food of all descriptions.

The value of ozone as an aid to the preservation of foodstuffs is being increasingly recognised, and this is no doubt due to the success achieved by the many plants which have been installed all over the world.

The essential value of ozone is its property of parting with an atom of oxygen, thus making it a powerful oxidising agent.

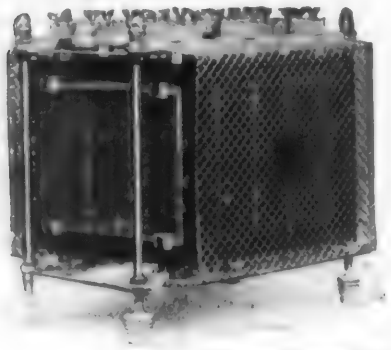
This peculiar property was first discovered in connection with electrical apparatus, and although there are other methods of generating ozone, the electrical method is by far the most satisfactory, mainly because no other gases or undesirable by-products are liberated by correctly designed apparatus.

The electrical ozone generator makes use of the silent electrical discharge, and consists essentially of a number of gauze plates of special design, through which the air passes and which have a suitable electrical potential applied to them. There are thus no working parts and their operation is entirely automatic.

The electrical supply required is the standard alternating current now used for all power and lighting purposes, but if direct current is still being used in the factory a converter can be easily installed to provide the necessary alternating supply.

For small rooms it is not necessary to make any structural alteration, as the plant is simply placed at a suitable point in the room. The con-

sumption of electricity is negligible, and some idea of this will be gathered from the fact that for a room containing 12,000 cubic feet of space the consumption of electricity will only be between 100 and 200 watts. A typical plant for a room of this size is shown in the illustration.



[*Courtesy Ozonair, Ltd.*

In the case of large factories it is preferable to instal a correctly designed system of air purification which will ensure that ozonised air reaches every part of the building. In an installation of this kind provision for air cooling is made at the same time.

A plant of this description provides for cleaning the air in addition to cooling and ozonising, and therefore combines a complete air-conditioning plant with the advantages of ozone.

Ozone apparatus for air purification is not in any way experimental, as many equipments have been running for over 30 years. There are many instances of original plants still in use exactly as they were installed as far back as 1905.

It may not be out of place to mention that small ozone units form an ideal method of keeping air pleasant in the reception-rooms and offices connected with food factories, and there are many forms of portable apparatus suitable for this purpose. The impression made on visitors and the beneficial effect on the staff more than repay the cost of installation and the very small cost of running.

* * *

New Premises for Makers of Flour Machinery

The firm of W. S. Barron and Son, Ltd., of Gloucester, makers of machinery for flour mills, sifters, mixers, grinders, etc., have extended their operations to a new factory and offices. A description of this palatial new headquarters is contained in a booklet issued by Barron.

Barron's "Standard" mixers, "Impact" and "Dreadnought" grinders, etc., are described in an interesting series of leaflets issued concurrently with the booklet. All are available free from Messrs. Barron at Bristol Road, Gloucester.

Courses in Food Technology

The Borough Polytechnic, Borough Road, S.E. 1, announce the following courses in relation to the foodstuffs industry—viz., canning, cold storage, chemistry of foodstuffs and microbiology of foodstuffs.

A special course of lectures on the *Technology of Canning* has been arranged to commence on October 6. The various aspects of the subject are being dealt with by specialists. The syllabus comprises:

Section 1 (*Introductory lecture*).—General history and development of canning. Other methods of food preservation. Outline of canning principles. Lecturer: A. F. Eaton, A.I.C.

Section 2 (*Three lectures*).—Tinplate manufacture, testing. Lacquering tinplate, lacquers. Testing lacquered plate. Can making, sealing compounds. Testing cans. Recent improvements in can production and protection. Miscellaneous containers. Lecturer: R. I. Johnson, B.Sc., A.I.C.

Section 3 (*Five lectures*).—Bacteriology of canning. Sterilisation of food products. Various methods of processing and cooling. Defective packs and spoilage, etc. Lecturer: N. B. Macmaster, M.Sc.

Section 4 (*Two lectures*).—Technology of meat canning. Preparation of raw materials. Methods of handling products and filling cans. Factory plant and equipment. Lecturer: T. Crosbie-Walsh, F.I.C.

Section 5 (*One lecture*).—Technology of fish canning. Lecturer: J. F. Morse, Esq.

Section 6 (*Two lectures*).—Technology of fruit and vegetable canning. Lecturer: F. Hirst, M.Sc., A.R.C.Sc., or G. Horner, M.Sc., D.I.C.

Section 7 (*One lecture*).—Technology of canning miscellaneous products. Lecturer: J. G. Huntley, B.A.

Section 8 (*One lecture*).—Chemical changes in canned foods, dietetic values, etc. Lecturer: Miss Bradford, B.Sc.

Fees for this Course.—Students under 18, 8s. 6d.; students over 18, 10s. to 20s.

For further details apply before September 29.

On *Cold Storage and Refrigeration* the lecturer is W. R. Wooldridge, Ph.D., M.Sc., M.R.C.V.S.

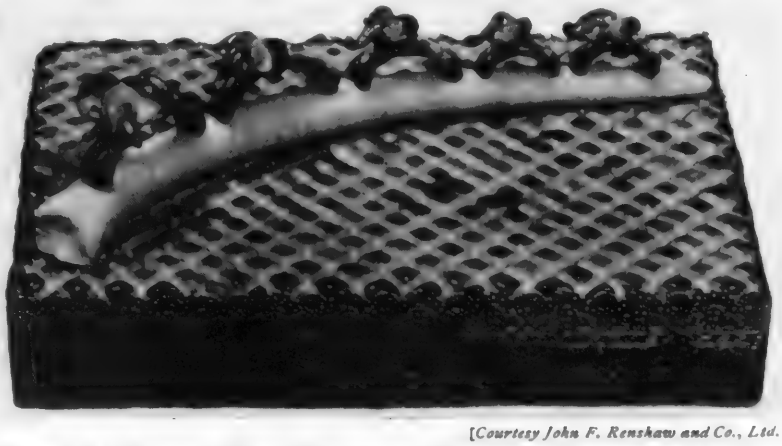
On Tuesday evenings, commencing September 27, there is a course of lectures from 7 to 8 p.m. dealing with modern developments in cold storage. These lectures deal primarily with the chemical and biological problems involved in the storage of foodstuffs, but those interested in the engineering and maintenance aspect of refrigeration may proceed to the lecture on *Functioning and Maintenance of Refrigerating Plant*, which is held on the same evening from 7.15 to 8.15.

On Wednesdays from 7 to 8 p.m., H. G. Rees, Ph.D., A.I.C., is lecturing on the *Chemistry of Foodstuffs*.

On Fridays, 7 to 9.30 p.m., H. A. Parkes, B.Sc., F.I.C., is lecturing on *Microbiology of Foodstuffs*.

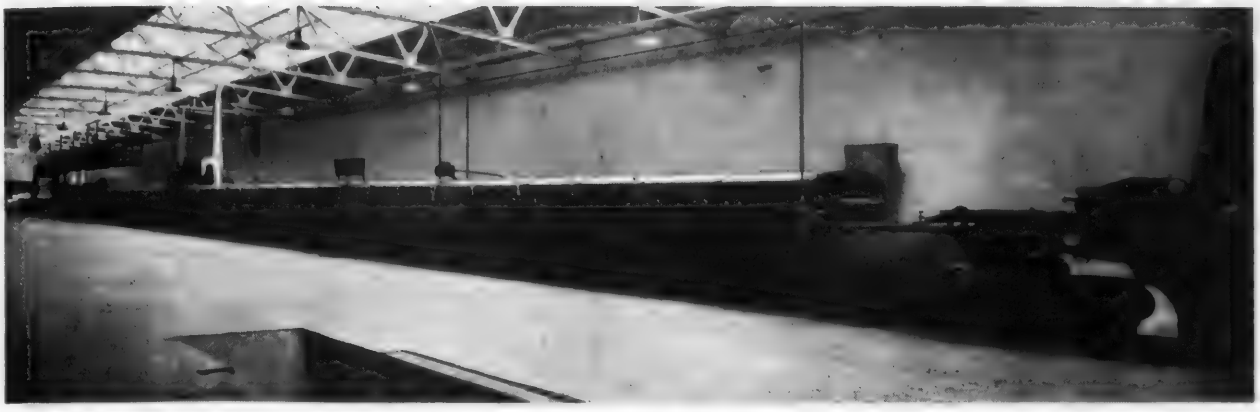
These classes are intended for the instruction of those, other than technical chemists, who are engaged in the manufacture, distribution or control of foodstuffs. The lectures deal in as general a way as possible with the nature of foodstuffs and food accessories, their function in diet, etc., and the application of principles and materials to the foodstuffs industry.

Further information can be had on application to the Principal.



[*Courtesy John F. Renshaw and Co., Ltd.*

Of interest in this special Flour Confectionery Number is this example of modern Simnel cake with the top decoration of marzipan.



A steel band oven made by T. T. Vicars, Ltd., who specialise in biscuit factory equipment, installed in the factory of Whittaker and Sons of Halifax.

1938 British Packaging Awards

" Having found its feet, British Packaging begins to go somewhere."

IN SPITE of rising costs, the last twelve months have been a year of intense activity in package design.

The growth of interest in packaging among makers of proprietary products is shown by the fact that, for the second annual Awards for British Packaging, organised by the magazine *Shelf Appeal*, entries were twice as numerous as in the previous year's contest.

More than 850 packs were submitted. As many were entered under several classifications; something like 2,500 separate decisions had to be taken by the judges.

The general level of craftsmanship shown by the entries was, report the judges, extremely high in some classifications, but extremely poor in others. In the section dealing with lettering, for example, which attracted a heavy entry, the report comments on " the tendency to outline lettering unnecessarily, to distort it, turn curves into angles and curlicues, exaggerated ascenders and descenders, confuse passable lettering with rules, odd-shape backgrounds and the like, to set masses of copy in capitals with too little space between the lines."

Of decorative design, too, the judges comment that " very few entries apart from the award winners showed in their design any appreciation of the pleasant and interesting textures and colours made possible by fancy papers."

The section which pleased the judges best by reason of its technical standard was that which might be called packaging engineering, or the study of the consumer's convenience. In the packing of such intractable products as gramophone needles, doyleys, paper handkerchiefs and salt, ingenuity was concentrated on solving problems which cause the consumer much irritation.

Because packaging and display are so closely related, three classifications were allotted to counter displays. Not only were entries vastly more numerous than in the previous year, but the standard was extremely high.

Batchelor's Peas got an award of merit for this " cardboard display incorporating actual or dummy packages as part of its design." The designers were Hudson Scott and Co., Ltd.

The judges report " constructional ingenuity, new materials, lettering, illustration, have all been exploited, and exploited well. Display, the winners indicate, is getting out of the showcard-cutout stage into something more carefully thought out, more efficiently planned to sell instead of merely to be seen."

Summing up, the judges' verdict on the progress of packaging and display in the last twelve months is that " manufacturers and designers are getting down to the serious business of merchandising, instead of being preoccupied with appearance and sheer purity of design. Having become package-conscious, British manufacturers are beginning to realise that a pretty package is not necessarily a selling one; that a redesign scheme is, by itself, no guarantee of improved business; that there are cases when a clean design becomes dead and characterless, and when a little down-to-earth workmanlike lack of the finer æsthetic points is very desirable. British packaging, in fact, having now found its feet is beginning to go somewhere."

Professor W. A. Bone

In the death of Professor William Arthur Bone on June 11, the field of fuel science has lost one of its most distinguished research workers. At Manchester, in 1896, he set out and proved the hydroxylation theory relating to the combustion of hydrocarbons. At Leeds, 1907, he experimented on " Surface Combustion " and its industrial application, the Bonecourt boiler being perhaps the best-known example. He became the first Livesey Professor in 1910, and in 1912 head of the department for the study of fuel and allied subjects at the Imperial College, London. There he was concerned with gases, and their oxidation and decomposition under high pressures; he also investigated very thoroughly the constitution of fuels and coal by pressure extraction with benzene and oxidation with permanganate. On retiring in 1936 arrangements were made for him to continue his researches. Apart from his many published papers and lectures, Professor Bone wrote several books, *Coal and its Scientific Uses*, *Gaseous Combustion at High Pressures*, and *Coal, its Constitution and Uses*.

CANNED FOOD PROPAGANDA IN FRANCE

DEALING with canned foods is a handsomely produced and lavishly illustrated booklet issued by the Office Technique pour l'Utilisation de l'Acier. It is an excellent example of popular propaganda for canned foods.

There are five sections. In the first, the author comments upon the tenacity of the suspicion which still exists in the minds of potential consumers of canned goods. He also points out the error of the idea that by taking canned foods as a basis for cooking it excludes any use of the cooking art.

Another of the sections deals with the biochemistry of foods; Section 3 with the "art and science of the utilisation of canned goods in the kitchen", and includes some interesting recipes; Section 4 with the economic advantages of preserved foods and gives some quite suggestive comparisons of the cost of dishes made respectively from fresh and preserved foods. For instance, a plate of peas for four persons is taken as an example:

PRICES CURRENT IN FEBRUARY, 1938.

Fresh Peas.

	Fr.
2 kilos of peas giving 1 litre of podded peas (or 4 portions)	13.00
Onions	1.00
Butter, 125 grm.	4.35
Lettuce	0.75
Salt and sugar	0.20
Gas used for 40 minutes of cooking, 0 cubic metre 123 litres, at 1 franc 25 cents. per cubic metre	0.15
Total	19.45

Canned Peas.

	Fr.
1 tin of cooked preserved peas	10.00
Butter, 100 grm.	3.55
Gas used, 10 minutes of re-heating, 51 litres at 1 franc 25 cents. per cubic metre ..	0.05
Total	13.60

Making a saving of 5 francs 85 cents.

[*Photo: Lachéray*

A selection of canned foods in the larder.

Section 5 describes (1) methods of preparing canned foods in the factory, (2) the names of the canned foods that are to be found on the market, (3) the sizes of the cans and the number of portions which they contain, (4) suggestions as to the building up of a stock of preserved foods in the household larder, (5) some indications as to the proper appearance of the contents of a tin of preserved food on opening.

The illustrations are well calculated to stimulate the interest of the consumer in canned foods.

Toxicity of Derris

STUDIES are reported upon the chronic toxicity of derris (*Derris elliptica*) for rabbits, dogs, and rats. For rabbits, 60 mg. per kg. and above showed signs of cumulative toxicity. In adult dogs on diets containing 0·04 per cent. derris, no symptoms of toxicity were observed. In young growing dogs on the same diet, the most pronounced effect was the stunting of growth. Derris diets containing less than 0·0312 per cent. derris had no demonstrable effect on growth of rats. As the concentration of derris in the diet was increased, the inhibition in growth was more marked.

Pathologic studies on the tissues of dogs and rats indicated that derris in all concentrations studied was somewhat injurious, the liver being the only organ consistently affected.—A. M. Ambrose and H. B. Haag, *Ind. Eng. Chem.*, **30**, 5, 592.

FROZEN FOODS RETAILED IN JAPAN

W. M. ZAROTSCHENZEFF

This article was written in Taikoku, Formosa, in June, 1938.

AMONG THE many surprises that one gets in Japan, perhaps none exceeded the discovery that retail distribution of frozen foods is not a novelty in this country.

Canned Goods Popular

When one visits the basement of the famous Mitsukoshi Department Store (similar in size and style to Macy's in New York or Selfridge's in London) there one finds the widest assortment of foods—fresh, dried, salted, pickled, cooked, and, finally, frozen. Incidentally, the great number of American leading brands, such as Borden's condensed milk, Swift's and Armour's canned meats, Del Monte's canned vegetables and fruits, Mazola, Heinz and innumerable other familiar names instil a healthy respect for the energetic foreign sales departments of leading American food manufacturers. Even in the smallest and most inaccessible places there are country stores stocking American canned goods, which certainly look more than odd in the midst of dried shark fins, dried tuna meat, sweet pickled radishes, bamboo shoots in season, and the inevitable dried seaweed.

Frozen Fish

Japan's climate being comparable with that of the American southern states, and the population depending mainly on two items of foods—rice and fresh fish—the development of refrigeration for preservation of fish is most logical. The whole country is dotted with large and small ice-making and cold storage plants, using American refrigeration machinery almost exclusively.

The refrigeration industry in Japan is unquestionably dominated by Nippon Suisan Kaisha, Ltd., a huge holding company, with 93 million yen capital (about $32.000.000), controlling more than 300 ice-making and cold storage plants, operating two of the world's largest floating canneries (each of 10,000 tons displacement); over 150 trawlers, of which more than a dozen are equipped with modern quick-freezing machines, dry ice plants, and floating icing stations.

Quick Frozen Foods

Three years ago this company commenced the retail distribution of frozen foods in exactly the same manner as it is done in America (Birdseye, Honor Brand, etc.).

However, in view of the peculiar merchandising practices, the American scheme has definite limitations and is restricted to large towns. Ordinarily the housewife does not go out to shop. Tradesmen send out to every house in their territory delivery boys who collect orders. There is no personal contact between consumer and merchant.

Refrigerated Cabinets

So far, Nippon Suisan Kaisha, Ltd., has installed seventeen low-temperature cabinets for retail distribution, most of them in large department stores. The cabinets are of local make, with air-cooled condensing units. They have large display windows which make construction rather expensive. Their cost ranges between 1,400 yen and 1,800 yen ($480 to $620). Frozen foods comprise fish of all kinds, in filleted and steaked form, shrimps, squid, green peas, beans, spinach, but no fruits as yet. The average price is 24 sen per pound (about 8 American cents), which is certainly very low, but is still higher than the retail prices paid for fresh fish, which is abundant and of excellent quality. Frozen shrimps, incidentally, are mostly imported from America and Mexico. The average daily sales per cabinet amount to about 30 yen ($9.00) and the daily volume is around 100 lb.

The retail store gross margin of profit is 20 per cent., and the store pays for the electric current, while the cabinet is owned by the company. Deliveries are made daily in small insulated trucks. Packaging has yet to be developed, and most of the foods are packed and frozen in small, thin wooden boxes. They are not as smart as some of the American products, but their improvement is but a matter of time.

Quality of Products

While the raw product used is undoubtedly of high quality, it is not comparable to American quick-frozen foods; this is due mainly to slow freezing and inadequate packaging. In the case of green peas, the proper variety suitable for freezing has yet to be found.

There is a huge field for widening quick-frozen food markets, and inasmuch as all other products are seasonal apart from fish, there are also good commercial reasons for adopting perishable foods in frosted form.

Typical Japanese Foods

Besides the quick freezing of most of the sea foods, which are well adapted for the purpose, there are certain typical Japanese foods which are being experimented with. Among them is "Take-no-ko" (young bamboo shoots), which is available only in April and is considered a delicacy and commands a high price. "Biwa" is another typical Japanese product, being something of a cross between a peach and a mango, delicious in flavour and taste. It is very popular and is in season only in May and June.

The growth of frosted foods in Japan may assume large proportions in the near future, and this can be explained by the marked transition of the country from an agricultural to an industrial basis, and by the rapid increase of the standard of living. The presence of such an active and progressive firm as Nippon Suisan Kaisha, Ltd., will undoubtedly accelerate and facilitate the spread of frosted foods.

INFORMATION and ADVICE

Copper in Tomato Purée—Charcoal Biscuits—Cold Mix Ice-Cream Powder—Substitute for Gum Tragacanth—Dandelion Coffee

Copper in Tomato Purée

4,293. *We would appreciate any information on the analysis of tomato products, such as purées, pastes and ketchup, and jams and jellies for copper. We understand your food laws are quite strict on this, and would like to know the number of parts per million allowed.* (Canada.)

There is no strict rule on the permitted amount of copper content to be present, but it is very definite that no added copper must be present.

According to the Chief Medical Officer of Health: "Tomatoes themselves may contain up to 5 parts per million of copper, which occurs naturally, and considering that most of the purée which is imported into this country is concentrated to at least one-third of its original bulk, up to 15 parts per million of copper in tomato purée may be considered to be derived from natural sources." According to the same authority, 15 to 40 parts per million of copper are commonly present in tomato purée, and this figure can be confirmed from many sources. In fairness to manufacturers, the maximum margin of 15 parts per million should be allowable as being within the range of natural copper, while anything in excess of this must be looked upon as contamination from the plant.

In view of the foregoing, it might be advisable for you to keep your copper content down to 15 parts per million.

Charcoal Biscuits

4,280. *We are interested in making coal biscuits and would be obliged if you could give any information and recipes of this kind of goods and what sort of coal is to be used.* (Sweden.)

We suggest that you experiment with the following recipe:

Flour	16 lb.
Cornflour	1 ,,
Charcoal	1 ,,
Bicarbonate of soda	2 oz.
Powdered tartaric acid	1 ,,
Butter	4 lb.
Sugar	2½ ,,
Milk	about 3 pints

Dough up with milk and cut with 3-inch cutter.

Cold Mix Ice-Cream Powder

4,255. *We should be very much obliged if you could give us a recipe for the manufacture of cold mix ice-cream powder.* (Ireland.)

We suggest the following formula as a basis for experiment for 100 lb. of ice-cream powder:

Sugar finely milled	70 lb.
Skim milk powder	17·5 ,,
Filler (say, soya bean flour)	7·5 ,,
Colloid (say, gum tragacanth)	5 ,,

Care should be taken in choosing the brand of milk powder, as many are not completely soluble. It is usually found that a powder prepared by the spray process is to be preferred. These ingredients, with any colour desired, should be very well mixed together—an efficient mixer will be required here—and packaged as soon as possible. The colour may be incorporated in the powder form if the following precautions be taken. First sift the powder colour through a 100-mesh sieve, and then grind the required quantity into a portion of the sugar and sieve this into the batch in the mixer. Unless this is done, and it is easily done by hand, it is almost impossible to secure an even distribution of the colour, owing to the extremely small amounts, often less than 1 gm., required.

Substitute for Gum Tragacanth

4,268. *We should be glad to know if there is a cheaper substance which could be substituted for gum tragacanth.* (Dublin.)

The names and addresses of firms were given.

Dandelion Coffee

4,271. *We should be obliged for formula and particulars for preparing a good-class liquid dandelion coffee essence.* (Leeds.)

We suggest that you experiment with the following recipe:

Water	3 gal.
Blended coffee	6 lb.
Roasted and ground dandelion roots	6 ,,
Sugar	12 ,,
Caramel colouring	30 oz.

The coffee and roasted dandelion roots may be heated in the water until it simmers, or the *boiling* water may be poured over them. Keep covered and warm for 2 hours or so, then strain and press. A tincture press is good for this purpose. Place the strained-off coffee liquid on one side, then treat the "grounds" with another 3 gal. of boiling water. Pour on, and do not boil. Press the liquid out, then evaporate, so that, with the first portion, 18 pints of extract is produced. Then add the sugar and burnt sugar colouring, strain and bottle.

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NEW COMPANIES

Barton Carton Company, Limited. (342707.) July 21. 61, Regent House, 235, Regent Street, W. 1. Mnfrs. of and dlrs. in cartons, containers, etc. £5,000. Permt. dirs.: C. N. Barton, 24, Holland Park, W.; A. G. Walker, 28, Campion Road, Putney.

A. E. Brand (Brighton), Limited. (342654.) July 20. 150, North Street, Brighton. To acquire the bus. of butchers cd. on by Knowlden (South Coast), Ltd., at 3a, York Place, Brighton. £2,000. Dirs.: H. C. B. Jones and Ellen E. A. Jones, 16, St. James's Street, Brighton; T. Nagle, 45, Upper Brighton Road, Worthing.

Carvers' (Caterers), Limited. (342797.) July 23. 353, Green Lane, Seven Kings, Essex. Bakers, confectioners, and caterers, etc. £1,000. Dirs.: J. Seymour, 1, Blake Hall Crescent, Wanstead, E. 11; A. H. Carver, 353, Green Lane, Seven Kings.

W. H. Field, Limited. (342194.) July 6. 22, The Calls, Leeds. Wholesale and retail grocers, provision mchts., etc. £5,000. Dirs.: W. H. Field and Mrs. A. A. Field, 46, Morris Lane, Kirstall, Leeds; Miss E. Field, 46, Morris Lane; W. Collis, 4, Blairsville Grove, Bramley, Leeds.

Fylde Fisheries, Limited. (342359.) July 11. Fish and chip restaurant proprs., etc. £1,000. Dir.: R. Flint Davenport, Causey Pike, Carleton Gate, Poulton-le-Fylde.

W. R. Grove and Son, Limited. (342029.) July 1. Fish salesmen and mchts., etc. £5,000. Dirs.: W. R. Grove and V. R. Grove, Hampton Road, Teddington, Middlesex.

G. Hartley and Son, Limited. (341994.) July 1. Potato and vegetable growers and mchts. £5,000. Permt. dirs.: G. Hartley, Bretwalda, Bexwell Road, Downham Market, Norfolk; G. A. Hartley, 104, Bexwell Road.

W. T. Hunt and Company, Limited. (342143.) July 4. Bakers and confectioners. £15,000. Dirs.: W. T. Hunt, Perran, Sandecotes Road, Parkstone, Dorset; R. F. Pounsett, Woodhayes, Wynford Road, Parkstone, Dorset.

W. J. Jackson, Wholesale Grocers, Limited. (342089.) July 2. Newburgh Works, off Dodworth Road, Barnsley. Wholesale grocers. £3,500. Permt. dirs.: W. H. Jackson, Mrs. S. J. Jackson, 31, Dodworth Road, Barnsley; H. Jackson, 17, Hunters Avenue, Barnsley.

Jones Brothers (Grocers), Limited. (342636.) July 19. 2, Louisa Street, Cardiff. Grocers and provision mchts. £2,500. Permt. gov. dirs.: T. H. Jones and J. G. Jones, 11, Woodland Place, Penarth.

Langley Catering Company, Limited. (342266.) July 8. 11, Shendish Edge, London Road, Hemel Hempstead, Herts. Café and snack-bar proprs. £1,000. Permt. dirs.: W. W. Amies, 11, Shendish Edge; E. F. Amies, 17, Keswick Avenue, Merton Park, London, S.W.; Joan Englebach, 339, Brixton Road, London, S.W.; E. C. Howell, 23, Shendish Edge.

Majestic Garden Hotel, Limited. (342542.) July 15. Hotel proprs., etc. £10,000. Dirs. to be appointed by the subs.

Moor House (Hindhead), Limited. (342952.) July 28. Moor House, Hindhead, Surrey. Hotel, restaurant, and café keepers, etc. £4,500. Dirs.: E. Stanley Southcombe, Pinewoods, Ascot; R. S. McWilton, 42, Foresters Drive, Wallington.

Stag Hotel (Redhill), Limited. (342702.) July 20. Lombard House, Great Charles Street, Birmingham, 3. Hotel proprs. £3,000. Dirs.: R. C. Edwards, The Hawthorns, Wootton, Wawen, Warwickshire; O. J. Cooper, The Green Dragon, Sambourne, Warwickshire; J. Morgan, 70, Salisbury Road, Moseley, Birmingham, 13.

The above-mentioned particulars of new companies recently registered have been extracted from the daily register of Messrs. Jordan and Sons, Ltd., company registration agents, Chancery Lane, W.C. 2.

TRADE MARKS

This list of Trade Marks of interest to readers has been selected from the "Official Trade Marks Journal", and is published by permission of the Controller of H.M. Stationery Office. The "Trade Marks Journal" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

DAIRYLEA.—579,352. **Cheese and substances used as food containing cheese.** Kraft Cheese Co., Ltd., Silverdale Road, Hayes, Middlesex. July 20.

FARP.—585,160. **Flour.** Chelsea Food Products, Ltd., 15, Lots Road, Chelsea, London, S.W. 10. July 27.

HARVEST GLORY.—586,131. **Currants and sultanas.** British Merchants Incorporated, Ltd., 32, Lime Street, London, E.C. 3. (Associated.) July 13.

HARVOSE.—585,904. **Substances used as food or as ingredients in food.** Harvo, Ltd., 257, Lawley Street, Birmingham, 4. (Associated.) July 27.

HERONIS.—586,310. **Substances prepared from the wheat germ for use as food.** John Henry Heron, Hook Road Mill, Goole, Yorkshire. July 27.

HYDROLITE.—584,616. **Compound lard for food.** The Peerless Refining Co. (Liverpool), Ltd., 49 to 71, Cheapside, Liverpool, 2. June 15.

Compound lards and goods of the same description will be struck out from the goods of Registration No. 463,790 (2496) if and before the applicants' mark is registered.

KING-OLAV.—580,849. **Canned fish and canned fish-cakes.** A/S Einar Hausvik and Co., 4, Strandkaien, Bergen, Norway. June 15.

Registration of this trade mark shall give no right to the exclusive use of the device of a fish or the numerals 1016-1028.

The applicants undertake to use the mark only on goods originating in Norway.

MATCHLESS.—583,556. **Flour.** Andrew Taylor and Co. (Glasgow), Ltd., 163, Hope Street, Glasgow, C. 2. (By Consent.) June 15.

Registration of this trade mark shall give no right to the exclusive use of the word "Matchless".

MOTHER'S PRIDE.—576,993. **Tea, sugar, coffee, cocoa, syrup (not alcoholic and not medicinal), jams and marmalade; fresh, preserved, dried, canned and bottled fruits, vegetables (for food), meats and fish; soups, sauces and pickles; sweets, biscuits, cakes and confectionery; milk, cheese, butter, edible oils and edible fats; and beverages (not alcoholic, not medicated, and not aerated); but not including margarine.** W. J. Brookes and Sons, Ltd., Skerton Road, Old Trafford, Manchester, 16. (Associated.) June 15.

NORDOG.—585,788. **Flour.** Weaver and Co., Ltd., Swansea Flour Mills, Swansea. (By Consent.) July 20.

ORANGEOLA.—584,958. **Edible preparations, containing orange juice for use as flavouring in foods.** Bruce Starke and Co., Ltd., 16, Water Lane, Great Tower Street, London, E.C. 3. June 15.

PILOT.—584,860. **Fresh and frozen poultry, game, and rabbits, all for food.** A. S. Juniper and Co., Ltd., 369 to 370, Smithfield Markets, London, E.C. 1. June 22.

RANGER.—586,590. **Fish.** Herbert Kingston, 110, Cannon Street, London, E.C. 4. July 27.

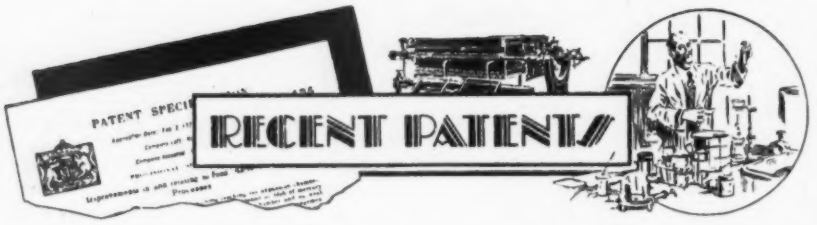
REVELATION.—584,396. **Chocolate and sugar confectionery.** Meltis, Ltd., 158, Drummond Road, Bermondsey, London, S.E. 16. (By Consent.) July 6.

ROBIN HOOD.—577,108. **Bacon.** I. Beer and Sons, Ltd., 15, King Street, West Smithfield, London, E.C. 1. June 22.

ROS-ROLS.—B 585,905. **Biscuits.** The Ros-Rol Products Co., Ltd., 13, St. Anne Street, Liverpool. July 20.

User claimed from April 27, 1933.

SUNKAP.—585,454. **Fruit juices (not alcoholic) and beverages (not alcoholic, not medicated, and not aerated), made from fruit juices.** O. R. Groves, Ltd., 32, Shaftesbury Avenue, London, W. 1. (Associated.) July 13.



These particulars of New Patents of interest to readers have been selected from the "Official Journal of Patents", and are published by permission of the Controller of H.M. Stationery Office. The "Official Journal of Patents" can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, price 1s. weekly (annual subscription £2 10s.).

Latest Patent Applications

34676. CADEC, LTD.: Apparatus for melting chocolate, etc. December 15.

34737. HILGERS, W.: Apparatus for butter-shaping machines. December 15.

34760. HILL, W. C.: Apparatus for extracting oils from fruits. December 15.

34895. RINNE, A.: Production of cola chocolate.

34981. CEFOIL, LTD.: Manufacture of jellies, etc.

35031. BAKER PERKINS, LTD.: Cutting, etc., machines for biscuit doughs, etc.

35063. KRAMP, J. H. F.: Devices for removing gills from herrings.

35205. GENOVA, A. F.: Apparatus for preparation of ice-creams, etc. December 20.

35223. BILDERBEEK, H. VAN: Apparatus for preparing whipped cream, etc. December 20.

35403. DUBBERS, H.: Preparation of crustless cheese. (June 4.)

35420. EVANS, W. E. (DEHA METALLWARENFABRIK M. HOCKRATH): Apparatus for extracting juices from fruits, etc.

Abstracts of Recent Specifications

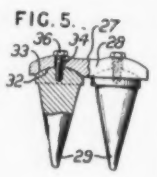
Group Abridgments can be obtained from the Patent Office, 25, Southampton Buildings, London, W.C. 2, either sheet by sheet as issued on payment of a subscription of 5s. per Group Volume, or in bound volumes price 2s. each.

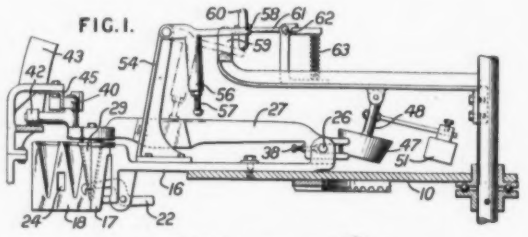
477,312. **Sugar.** ANTICH, J., and BLANES, F.

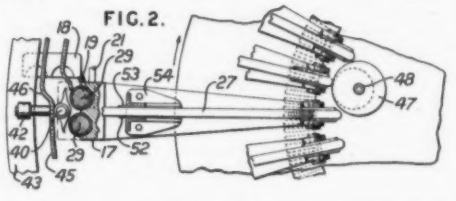
Carob beans and similar fruits are macerated in water, the extract being treated with an alkaline earth carbonate, filtered, freed from impurities, and finally treated in known manner to obtain saccharose and molasses. The impurities may be removed by treating the filtrate with lime, heating, filtering, and carbonating, or by treating it with an alkaline earth carbonate, heating, and filtering. Tannic and pectinous products are extracted from the residues and waste products of the process.

477,682. **Making wafer biscuits.** TURNBULL, W. W.

In a machine for making pastry cups or cones a plurality of mould units are employed, each comprising a base part 16 secured to a common rotary carrier 10, a core-carrying arm 27 mounted at its inner end for pivotal and sliding motion, a mould having pasting cavities, formed in two parts 17, 18, the part 17 being secured to the end of the base 16 and connected to the part 18 by a hinge 19, the parts 17, 18 being held together, when closed, by a pivoted latch 22, which engages an opening 24 in the part 18. The cones 29 are raised from the mould 17, 18 by a roller 42, which rides on a cam rail 43, and the core arm 27 is moved outwards, when the rise begins and the mould part 18 has been swung open by the cam rail 21, by a roller 47 on a pivoted arm 48, which is overweighted by an adjustable weight 51, the inward movement of the arm 27 being controlled by an adjustable stop 38. A roller 40 on the arm 27 co-operates with a fixed cam 45 having a rise 46, which permits the outward movement of the arm. After ejection of the cones the arm 27, being inclined, slides down until the stop 38 contacts with the pivot pin 26, or, alternatively, the cam 45 may be formed to effect this positively. The mould part 18 is swung closed, locked, arm 27 is lowered by the cam 43, teetered to permit escape of steam, and locked by a pivoted







lever 56 having an arm 58, which is forced down by a wheel 60 to apply the locking-pressure on the arm 27. The lever 56 has an adjustable end 57, and the wheel 60 is mounted on a rod 61 pivoted at 62 and under the influence of a compression spring 63. The arm 58 is raised, to release the lock, by a cam rail 59. The cores 29 have spherical surfaces or seats 32, which are received in correspondingly shaped recesses 33 in the core-carrying head 28 of the arm 27. The securing bolts 36 have play in the holes 34, adjustment of the cores 29 to ensure correct centring in the mould parts 17, 18 being thus permitted. Side play of the arm 27 is prevented by sliding surfaces 52, 53, which work in a vertical slot in the support 54 for the locking lever 56. The mould units may be mounted on an endless chain or on a vertically arranged wheel.

480,096. **Extracting pectin.** ROSENFIELD, B.

Pectin is extracted from citrus fruits or fruit peel by a process in which the parent material is treated with a restricted quantity of a softening or swelling agent prior to, or simultaneously with, its extraction with a neutral or acidified aqueous solvent. The softening agents used are alkyl or aryl esters of aliphatic or aromatic acids, such as ethyl or butyl acetate, methyl or ethyl benzoate or salicylate; xylene; halogen substituted hydrocarbons such as chloroform; or inorganic sulphocyanides such as calcium sulphocyanide; or mixtures of these. The softening agents are added in quantity not exceeding one-fifth that of the material treated and remain present during the extraction. The extraction is preferably carried out at about pH2, and when mineral acids such as sulphuric or hydrochloric are used it is preferred to add a buffer consisting of a weak acid or a salt thereof, such as tartaric or citric acids, sodium phosphate, or potassium tartrate. The provisional specification contains an example, according to which a much larger proportion of butyl acetate is employed.

481,814. **Hinged covers for vats, etc.** ALUMINIUM PLANT AND VESSEL CO., LTD., CROSBY, W. E., and BURNETT, A. C.

A hinged cover for a vat such as a cream vat or other container for holding or treating liquids comprises two sheet metal curved lids, each hinged by means of a torque tube rotatable at one end on a fixed trunnion, and carrying at its other end a rotatable trunnion, each trunnion being carried by a pillar separate from the vat, or by a bracket secured on the vat or its support. A steel torsion rod is secured by a screw in the fixed trunnion and by a screw to the rotatable trunnion so that it becomes flexed by the movement of the lid. The rod may be flexed so that it opposes any tendency of the lid to close by its own weight and so that it will remain in any position in which it is placed. Blocks may steady the rod, and more than one torque rod may be used in the tube. Friction damping devices may be used when the cover is heavy. One of the trunnions may be fitted with a cam, etc., so that the cover may be arranged to remain in a predetermined position.